SPECIAL WOOLEN NUMBER.

Volume XV.
Number 4.

OCTOBER, 1898.

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GUILD & LORD, Publishers, 620 Atlantic Avenue, Boston, Mass.

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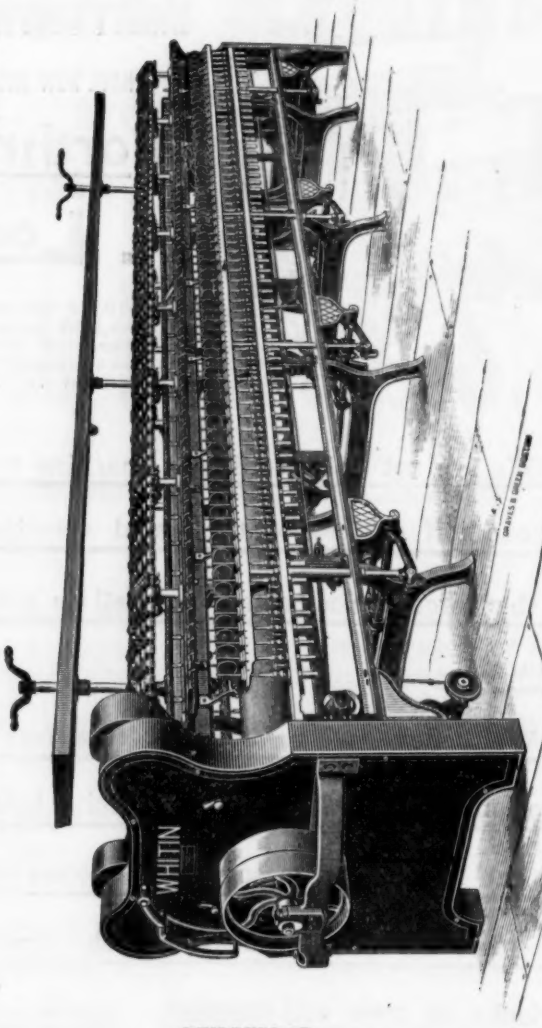

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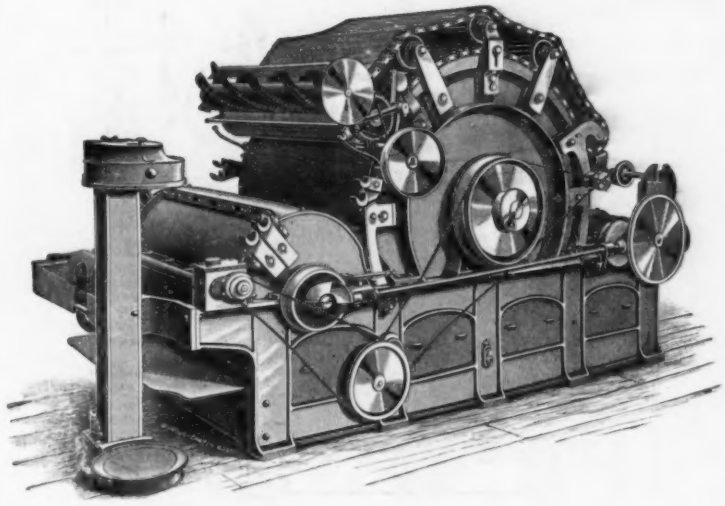

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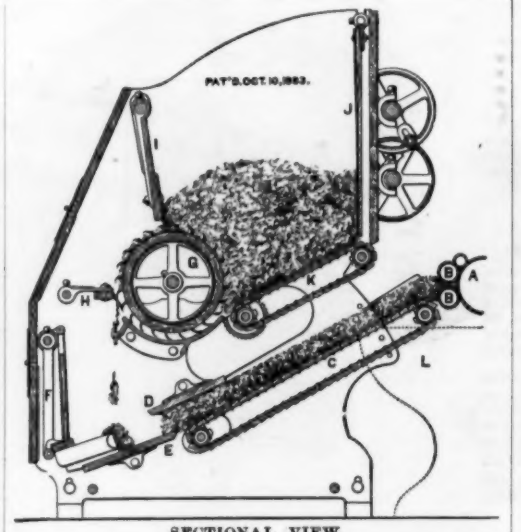

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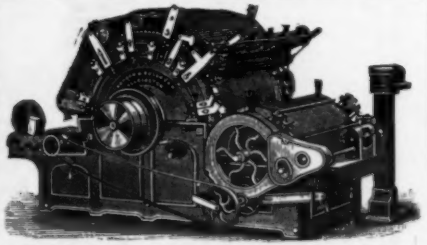

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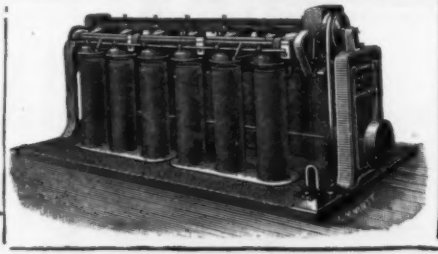

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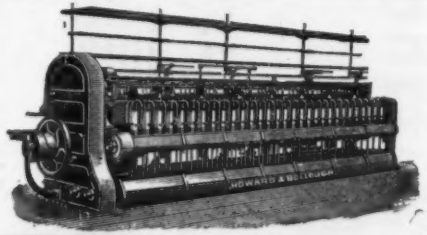

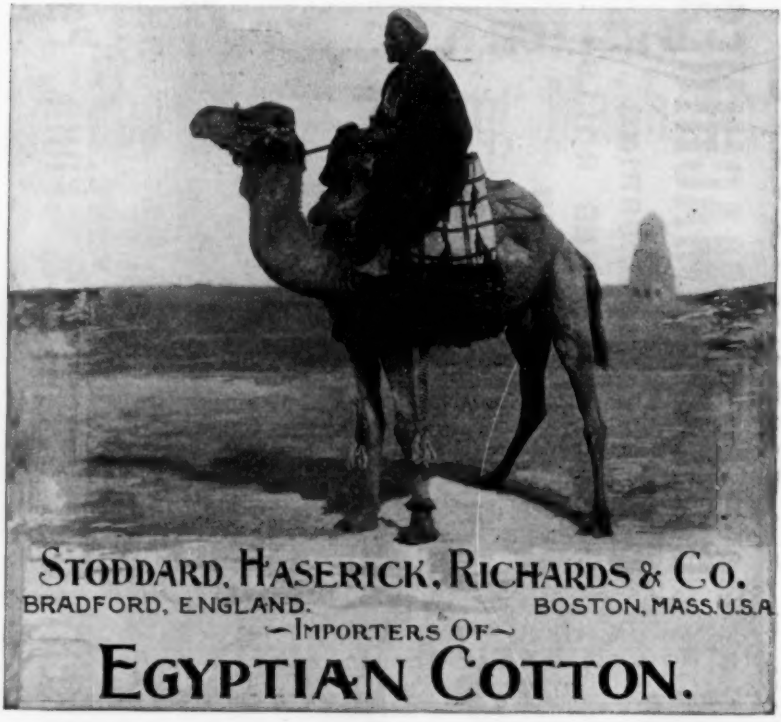

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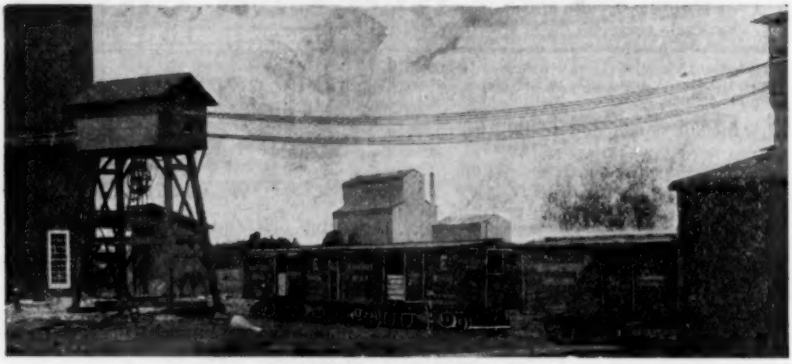

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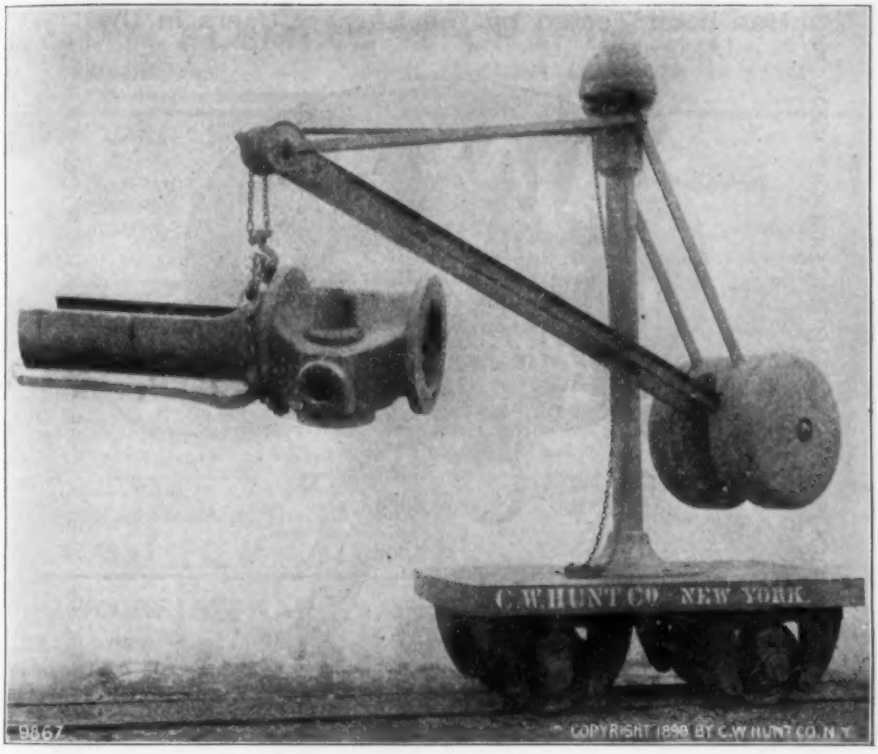

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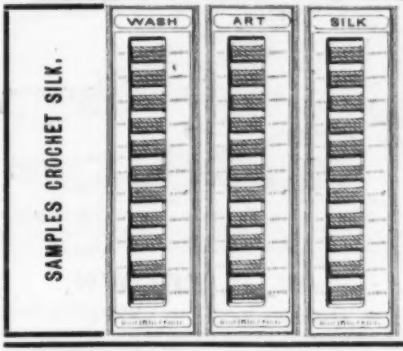

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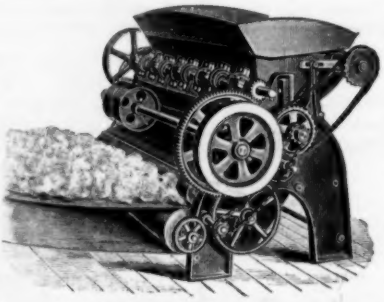

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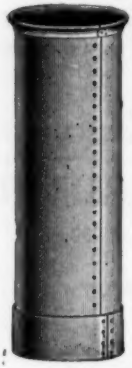

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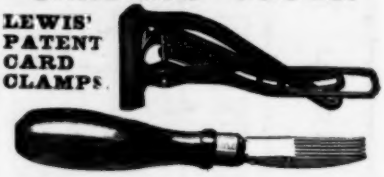

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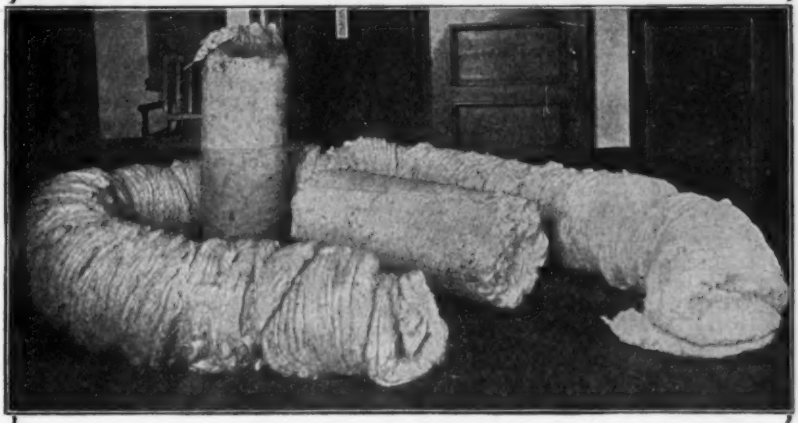

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Adams Building, 23 Court St., Boston.

List of Textile Patents.

Issued August 23 and 30, and September 6 and 13, 1898.

Specifications and drawings furnished for ten cents each Address W. S. Gavey, P. O. Box 222, Brooklyn, N. Y.

Bleaching Powder, Process of and Apparatus for Making. 610,265. Vero C. Driffield, Widnes, Arthur Carey, Liverpool, and Frederick W. Wright, Widnes, England, assignors to the United Alkali Company, Ltd, Liverpool, England.

Combing Machine. 610,464. A. Wenning and C. H. Gegauff, Mulhouse, Germany, assignors to La Societe Alsacienne de Constructions Mecaniques, same place.

Carding-Machine Feeding Mechanism. 610,655. T. R. Marsden, Oldham, England.

Carpet Fabric, Two-ply Ingrain. 610,742. H. Hardwick, Philadelphia, Penn.

Cotton Distributer and Cleaner, Seed. 610,667. F Walla, Frelsburg, Texas.

Cotton Elevator and Distributer, Automatic. 610,293. H. J. Wheeler, Hutchins, Texas, assignor of one-half to Benjamin D. Atwell, same place.

Holland and Colonies.

Patents. Trade Marks.

H. Massink, L. D. at Amsterdam.

Card-points, Process of and Apparatus for Hardening. 610,022. G. Bovensiepen, Mettmann, Germany.

Carding Engine. 610,138. A. Haigh Huddersfield, Eng., and A. Borios, Vevy, Switzerland.

Carding-Engine Flats, Apparatus for Stripping. 609,911. W. Senior, Pendleton, England, assignor to James Williams, Salford, England.

Carding-Engine Flats, Apparatus for Stripping. 609,912. W. Senior, Pendleton, England, assignor to James Williams, Salford, England.

Carding-Engine Flats, Apparatus for Stripping. 609,859. J. Williams, Salford, England.

Carding-Engine Flats, Apparatus for Stripping. 609,860. J. Williams, Salford, England.

(Continued on page 22.)

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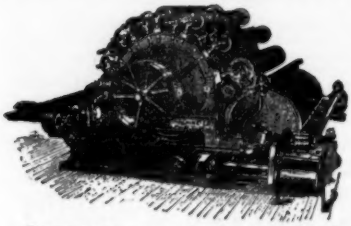

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Embroidering Machine, Jacquard Mechanism. 610,248. R. Scott, Nottingham, England.

Gin Brush. 609,464. E. Y. Reese, Atlanta, Ga., assignor of one-half to George M. McKinnon.

Hats, Manufacture of Felt. 610,627. J. B. Harrison, Stockport, England

Knitting Machine, Circular. 610,461. C. T. Stetson (Deceased), West Hanover, Mass., assignor to James Bennett Forsyth, Boston, Mass.

Knitted Fabric, Striped. 609,707. R. W. Scott, Philadelphia, Pa., assignor of one-half to Louis N. D. Williams, Ashbourne, Pa.

(Continued on page 125.)

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ROWLAND HAZARD.

TEXTILE WORLD.

Vol. XV. OCTOBER, 1898. No. 4.

ROWLAND HAZARD.

Rowland Hazard, of Peace Dale, Rhode Island, whose death occurred on August sixteenth, was a manufacturer all his life, and he rejoiced in taking raw material and turning it to the use of man. His was a productive and constructive mind. No mere handling of goods appealed to him, it was the creation of value by applying honest thought and work that he rejoiced in.

And he left the world a better place from having lived in it. His connection with the Peace Dale Manufacturing Company began before that company was incorporated or he had any official part in its work. The woolen mills were established on the Saugatucket by his grandfather about the year 1800. The first carding machine was set up in 1803, and the mills gradually grew.

In one of Mr. Hazard's college vacations in 1848, there was a strike in Peace Dale. His father was away, and he, a young fellow of twenty, managed it entirely, insisting on the men returning to their work before he would treat with them, and coming to a settlement very soon. He never had another strike.

At that time the hours of labor were very irregular. In summer the mills began running about sunrise, and there was a breakfast hour about seven. As the days shortened, the hours were shorter, and in winter artificial light was used both morning and evening. When Mr. Hazard entered the firm in 1853, one of his first tasks was to systematize the hours of labor. From 1855 to 1860 he was superintendent of the mill, designer, and head dyer all in one. His careful study of Scotch plaids bore fruit in the Peace Dale shawls. One season he had a very beautiful crimson shawl which was a great success. Whatever he undertook was most thoroughly done.

At the outbreak of the war a large government contract was awarded the mills. The indigo dyeing had been superseded, and Mr. Hazard went himself to find a dyer and learned the process from him, using the discarded vats still in the mill. He selected the wool with the greatest care. The sample piece sent to match had white hairs in it where the dead wool had not taken the color. The cloth—some thousands of yards—was finished of the exact color, and even better quality than demanded, as the wool was all good. The price had been set at $1.50 per yard, which yielded a small profit only. What was Mr. Hazard's disgust to have the goods refused on the ground that there were no white hairs in them! It was a serious blow, but he held on to his good cloth, with the result that in a few weeks A. T. Stewart bought it at $2.00 a yard instead of the contract price, to sell to the government at an advance. The government lost a dollar a yard on these thousands of yards. When Mr. Hazard told this story recently he was asked if the inspector had not expected a present to pass it. "Yes," he replied with hesitation, "I suppose he did." But nothing was offered him. Mr. Hazard faced the possible loss, rather than offer a bribe. In fact, it was only in later years that it occurred to him as an explanation, that a bribe was expected.

In 1872 a large stone building was added to the mills, designed by Mr.

Hazard for the manufacture of worsted coatings. The best machinery was imported from England, including combing machines. The company has since then combed its own tops, and spun its own worsted yarns. Ten years later (1882) a new weave shop was erected covering nearly half an acre of ground, and in 1896 one of the old mills was remodelled and added to. The weave shop is only one story high, with ample light coming from skylights as well as windows. For all these buildings Mr. Hazard made the calculations, having made a careful study of construction.

Mr. Hazard's personal interest in all with whom he had any concern was a marked feature of his character. When he took hold of the mills the workmen lived in tenement houses. He inaugurated a different policy and encouraged the men to buy small houses which the company put up. The garden patch which each man had in the public garden land was given up before very long, as the men had gardens about their own homes.

Co-operation early enlisted his attention, and for ten years he issued a circular to his employes on the subject. The first one was dated Jan. 31, 1879, which announced the plan. There were not sufficient profits that year to declare a dividend to labor, but in 1880 and 1881 a dividend of five per cent. was declared, and in 1882 and 1883 one of three per cent.; about $20,000 being divided in this way among the operatives. This dividend Mr. Hazard declares in the circular of 1881 "is in excess of regular wages and can only be justified by increase of diligence and care on the part of those employed. * * * * * What we most desire to see is that spirit of kindly confidence which shall make every one employed in the Peace Dale Mills feel that the interest of the establishment is his own interest."

It was this spirit of kindly confidence united to great ability, and an intuitive perception of character that gave Mr. Hazard his success as a business man. The place in which he lived was always near his heart. He built the church in 1872, which had been first gathered in his own house in 1857. The Hazard Memorial to the memory of his father built in 1891 was dear to him. Here the library, which he also was active in founding in the fifties finds a home, and the hall for music has few equals for beauty and good acoustic properties. His last appearances in public were at the graduation of the High School, and the district school in June. On both of these occasions he made addresses.

Mr. Hazard had other and varied occupations. He owned a lead mine for twenty years, and was the president of the Solvay Process Company which introduced the manufacture of soda by the ammonia process into this country. But it is as a textile worker we especially desire to speak of him. He took a mill which had been making negro cloths, and developed it in the best way, so that Peace Dale serges and cassimeres are now widely known. In doing this he developed his village and his town, so that not only the mill but the place is his monument.

He was born in Newport, R. I., August 16, 1829.

Graduated from Brown University, 1849.

Married Margaret Anna Rood, March 29, 1854.

Died, August 16, 1898.

—Every practical handler of wool knows that the article is very hygroscopic, readily absorbing moisture from the atmosphere and retaining it with considerable energy.

—In treating on the composition of wool, every one knows that in the growth of the fibre certain glands situated beneath the skin of the animal exude a greasy substance which, coating the fibres to a considerable thickness, serves to protect them from injury. The amount of this encrusting or rather preserving substance is very variable, and on the raw fibre it is always associated with more or less sand, dirt, and other foreign matter.

Textile World

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Special quarterly issues are published in January, April, July and October; one (January) being a statistical issue, and the others devoted especially to the cotton, knitting and woolen branches, respectively.

TEXTILES AT THE PARIS EXPOSITION.

A paper was read on this subject at the recent meeting of the New England Cotton Manufacturers' Association, which undoubtedly would have received more attention than was accorded to it had it not been for the lateness of its appearance on the programme.

Some attention should be given to a proper representation of the textile industries at this exposition in 1900, and we hope that the representative textile organizations will take the matter in hand and stir up a proper sentiment among manufacturers for a creditable exhibit of their production. There are many classes of goods, especially in the cotton lines, that can be exhibited to American credit.

In previous foreign international expositions, the American manufacturer has not felt any inducement to exhibit his products in the hope of receiving any pecuniary advantage therefrom. The American cost of manufacture has always been in the way for establishing a profitable foreign trade, until within recent years in the manufacture of coarse cotton goods for Asiatic and South American consumption.

Whenever exhibits have been made, American manufactures have invariably ranked high in quality and style of fabrication. They were better represented in the Paris exposition of 1878 than in that of 1889. At the 1878 exposition, gold medals were given to American carpets (moquettes); wool (Vermont merino); felt and silk hats; cotton flannels; and cambrics, shirtings, etc. Silver medals were given to American silk serges and dress goods; piano felts; calicoes; bleached cotton goods; felt hats; spool cotton; besides wool and Sea Island cotton. Bronze medals were given to American cotton sheetings and quilts; printed calicoes; besides a large number of exhibits of merino wool from Vermont, New York, etc. Quite a number of exhibits received honorable mention, among them merino wool.

At the 1889 Paris exposition, American hats of felt received the grand prize. The gold medal was not so freely distributed as in 1878, but a number of exhibits received silver medals and honorable mention. These exhibits were taken care of chiefly by manufacturers' agents and commission merchants. The Arlington Mills, Lawrence, Mass., exhibited illustrations of partial processes in the manufacture of spun yarn, used by manufacturers for covering wire, and various processes in the manufacture of ladies' dress goods. The Middlesex Mills, Lowell, Mass., showed a series of illustrations of partial processes in the manufacture of yacht cloth, and the United States Bunting Co., of Lowell, Mass., a series of processes in the manufacture of bunting for flags, while one exhibit illustrated the manufacture of hemp and flax twine, and another of hemp binder twine. American wools and Sea Island cotton were also shown, receiving silver medals. One exhibit of Sea Island cotton received a gold medal.

AUSTRALIAN WOOL CLIP.

Our recent advices from Australia give additional confirmation of the heavy shortage in the merino wool clip of that country for the past season, which, in the ordinary course of events, will cause the values of fine grades to either materially advance or be strongly maintained. This is but the natural result of the tendency throughout the world of leaving the merino blooded for the crossbred sheep. Besides that, the fine wools of Australia are deteriorating rather than improving, due to the forced tendency of the flocks from the green fields of Eastern Australia to the arid regions more to the westward. In order to counteract to some extent, or as far as possible, the natural decline in the quality of the fleece from sheep that roam in the central regions of New South Wales and adjoining colonies, sheep breeders have been and are introducing a wrinkled and yolky fleeced sheep of the Vermont type. These sheep are valued for their well known excellent qualities of yielding a fleece having an abundance of yolk, which is regarded as an excellent resister of dust in the dry regions, and for keeping the wool soft and silky to the feel. At the recent annual agricultural shows in Australia, Vermont sheep have stood well in the van, receiving in many instances the highest awards that were offered, for the very qualities just referred to.

The wool production of 1897-98 was less by 173,502 bales than the clip of 1896-97. There was a decrease in all of the colonies, with the exception of New Zealand, where the crossbreds predominated. In this colony there was an increase in the wool production of over 55,000 bales. According to the latest statistics, the number of sheep in all Australasia was 106,717,626 over 41 per cent. of which were in New South Wales.

We note that the price of greasy merino wool averaged in the month of August, 9d. for fleece, 7¼d. for pieces, and 5¾d. for bellies, all of the super grade. From these prices we have made the following calculations, assuming in the first instance that the pieces and bellies, or skirts, as they may be denominated for convenience, are valued at 5¾ pence, when consisting of but ten per cent. of the whole fleece, leaving the body wool, of 90 per cent., valued at 9d. This makes the basis of our calculation, with the value of the whole fleece at 8.68 pence per pound. Other things being equal, the value of both the body and skirts increases as the percentage of the quantity of the skirts removed is increased; that is, both the skirts and the body improve, relatively, in quality and price.

Upon this assumption, it will be seen that the body of the fleece increases but 3/10d. per pound in value from a ten per cent. to a thirty per cent. skirting. Even assuming that the skirts do not improve in market value with the increased percentage of removal from the whole fleece, as noted

Body	90 at 9d.	=8.10
Skirts (pieces and bellies)	10 at 5¼	= .58
		8.68
Body	80 at 9.22	=7 38
Skirts	20 at 6.50	=1.30
		8 68
Body	70 at 9.3	=6 50
Skirts	30 at 7¼	=2.18
		8.68
Body	70 at 9 94	=6 96
Skirts	30 at 5¾	=1.72
		8.68

in our last calculation, the increase in the value of the body wool amounts to only .94d. per pound.

We produce these examples to show the folly of the contention in the tariff discussion that the body of the fleece is greatly enhanced in value by the skirting process, though it be as great as thirty per cent., which is more than compensated for in the present customs tariff rate of eleven cents per pound.

—The general sentiment of the members present at the last meeting of the New England Cotton Manufacturers' Association, favored the holding of next year's semi-annual meeting at Montreal, Canada. In some respects, this would be an ideal place for a gathering of this kind.

—One of our esteemed New York exchanges makes the sage remark that the price of cotton is fixed in this country because we raise over sixty per cent. of the total production in the world. As a matter of fact, however, the price is determined where most of the cottons of the world are marketed, and that is at Liverpool.

—The estimated cost of the war with Spain is placed at $235,000,000, without taking into consideration the pensions that will have to be paid. In order to meet this, we have the sale of the two hundred million dollar bonds, and the estimated revenue for the present fiscal year of $140,000,000, making a total of $340,000,000, leaving an excess of $105,000,000 over the probable cost of the war. What will be done with this excess will be one of the problems for Congress to settle at some one of its future sessions.

—The suspension of the wool exchange at New York, was not an unexpected thing, as such a scheme was entirely out of the practical questions affecting the conduct of the wool trade in this country. It was undertaken as a sentimental project, to boom New York as a wool emporium, against the natural course of trade. It is absurd to think that wool auctions can be regularly sustained in this country, with only the American market to cater to. It is quite different with the wool auctions in London, where the whole world is represented among the bidders.

—The United States Treasury and Congress will have to deal with an enormous surplus very shortly, and measures will have to be taken concerning the disposition of our revenues and the regulation of our currency. We do not expect to hear a great deal in Congress for some time to come about the free coinage of silver.

THE WOOL TARIFF.

THE WASTE PARAGRAPHS.

We do not know of any portion of the tariff appertaining to wool that is more difficult to understand than the paragraphs relating to the waste products. In order to give a clearer conception of the meaning of these waste products and what they really are, is our present object of trying to explain them by several illustrations, given herewith.

The waste paragraphs in the several tariff acts since 1867 have been subject to several important changes, as noted below.

The 1867 act had the following provision: "Woolen rags, shoddy, mungo, waste, and flocks, the duty shall be twelve cents per pound."

The 1883 act had this provision: "Woolen rags, shoddy, mungo, waste and flocks, ten cents per pound."

The 1890 act had provisions thus: "On noils, shoddy, top waste, slubbing waste, roving waste, ring waste, yarn

waste, garnetted waste, and all other wastes composed wholly or in part of wool, the duty shall be thirty cents per pound; on woolen rags, mungo and flocks, the duty shall be ten cents per pound."

The 1894 act had this provision: "On flocks, mungo, shoddy, garnetted waste, and carded waste, and carbonized noils, or carbonized wool, fifteen per cent. ad valorem; and on wool of the sheep, hair of the camel, goat, alpaca, or other like animals, in the form of roving, roping, or tops, twenty per cent. ad valorem. Under this act the following were admitted free of duty: "Noils, yarn waste, card waste, bur waste, slubbing waste, roving waste, ring waste, and all waste, or rags, composed wholly or in part of wool."

The 1897 act, which is now in operation, contains the following provisions: (Paragraph 361.) "Top waste, slubbing waste, roving waste, ring waste, and garnetted waste, thirty cents per pound." (Paragraph 362.) "Shoddy, twenty-five cents per pound; noils, wool extract, yarn waste, thread waste, and all other wastes composed wholly or in part of wool, and not specially provided for in this act, twenty cents per pound." (Paragraph 363.) "Woolen rags, mungo, and flocks, ten cents per pound."

The growth of the worsted industry, here and abroad, manifested itself first in the waste clauses of the tariff act of 1890, as will be noted above.

Our illustrations refer more particularly to the waste paragraphs of the present act. These paragraphs were more or less modified from the time they were reported to the House of Representatives till their final adoption by Congress. In order to show the changes made in these paragraphs, we will note them as follows: As reported by the Committee on Ways and Means, and as referred to the Senate Committee on Finance, the waste products were put into two paragraphs. The first paragraph read, "On noils, shoddy, top waste, slubbing waste, roving waste, ring waste, yarn waste, garnetted waste, and all other wastes composed wholly or in part of wool, the duty shall be thirty cents a pound." The second paragraph read, "On woolen rags, mungo, and flocks, the duty shall be ten cents per pound." The Committee on Finance made no changes in these paragraphs, other than to impose a duty of twenty cents per pound, instead of thirty cents, on noils, shoddy, etc.; except as suggested in the open Senate, when the classification and rates of duty were somewhat modified and arranged into three paragraphs, instead of two, the same as they appear in the present act; only that the words "wool extract," in paragraph 362, were inserted by the Conference Committee of the Senate and the House. The classification as it now stands in the tariff is as unobjectionable as it can readily be.

The term "thread waste," in paragraph 362, was introduced by the Senate, apparently for the purpose of covering any slight distinction that possibly might occur in commercial usage or phraseology. As a matter of fact, the term "yarn waste," and "thread waste" from wool, are synonymous in trade parlance.

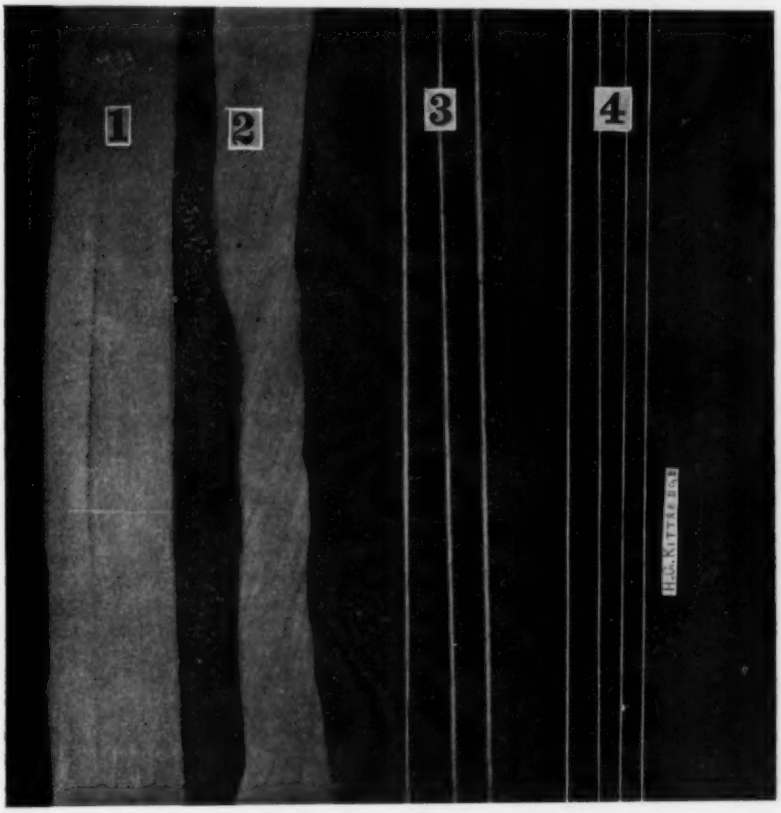
Waste known as top, slubbing and roving, are practically the same, simply differing in attenuation. Roving is no more than an attenuated top.

We illustrate a top, slubbing, roving and yarn, the latter, in this instance, being two-ply.

A top is a form of sliver, and is an untwisted strand of wool. It is the final, or finished, form of the sliver purified or freed from short fibres, preparatory to being made into slubbing. The term "top" is of Anglo-Saxon extraction, uncertain in its origin, and employed only in worsted manufacture. It is the most perfect condition in which wool is put by any process of manufacture, and this state of perfection is maintained throughout all subsequent processes; therefore, its waste is of the highest quality, and is the best, together with that from slubbing and roving, that is made, approx-

imating scoured wool in its usefulness; and were it free from oil and mill stains, it might consistently bear the same rate of duty.

Slubbing is a top drawn down finer, and receiving the first twist in the process of manufacture. Roving is the roving from it by hand. The waste comes off in the form of a ring, and consists of a length of roving equal to one draw of the carriage mule from the delivery roll, or the length of one delivery of roving. The loose end, as seen in our illustration, is a part of



Top Slubbing Roving Yarn

WOOL TARIFF — PARAGRAPHS 361 AND 362.

same as slubbing, drawn down finer, with still more twist in it, and is that from which the yarn is spun. Ring waste is so named because it appears in the form of a ring, and is simply a roving waste that is made on the spinning mule, caused by the roving breaking in the process of spinning and winding about one of the delivery rolls, which is cleared by removing the roll from its bearings and slipping the yarn with a slight amount of twist in it.

A noil is the short fibres of wool removed in the process of combing, or converting the sliver into a top.

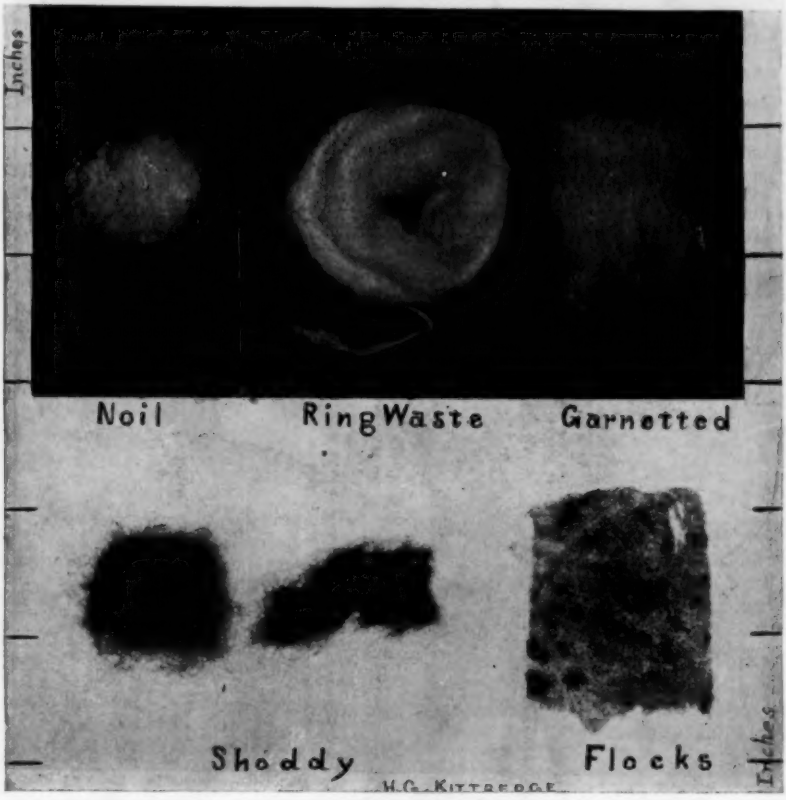
Garnetted waste is that which has passed through a carding operation on a peculiar machine, named from the inventor, Garnett. Garnetted waste is that made from yarn and other wastes that require rigid opening by a

process which will separate the fibres and prepare them for the first operation of carding.

Shoddy is made from rags picked to pieces and the fibres separated on a machine especially constructed for this purpose.

Wool extract is in its nature similar to shoddy, but made from rags from which has been extracted, by some chemical process, all vegetable matter, leaving nothing but the clear wool. In our illustration, we show two specimens of shoddy, one of long staple, the other of short staple. The short staple specimen may be taken as representative of mungo, which is a term not used in this country, but confined to England, and, in a measure, is the same as shoddy, as made from closely felted rags.

We have endeavored to show flocks in our illustrations, which are nothing more than rags, or wool waste from the shear, or elsewhere, ground to a powder, and used in the manufacture of low grades of woolens, by being driven into the cloth by mechanical means.



WOOL TARIFF.—PARAGRAPHS 361, 362 AND 363.

—The highest ideals inspire improvement by the influence of their perfections.

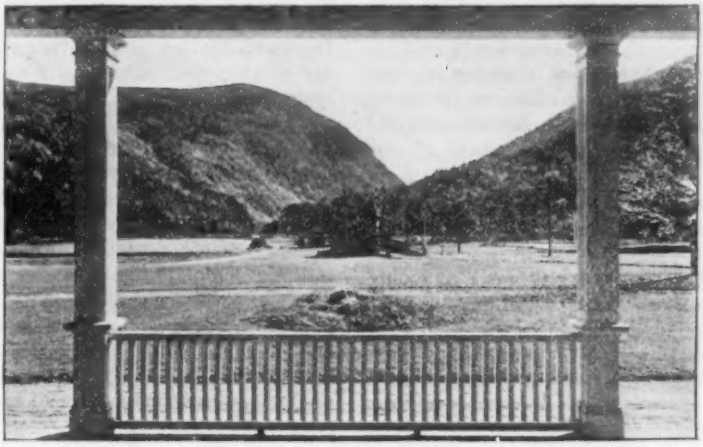
—The successful buyer is one who is conversant with his business and who is likewise a man of resolute character.

NEW ENGLAND COTTON MANUFACTURERS' ASSOCIATION

Semi-Annual Meeting at the Crawford House, N. H., Sept. 27-29, 1898.

In many respects the most successful meeting of this Association from a social point of view, occurred at the Crawford House last month, at which over 120 members and guests were present. Everything contributed to make the meeting one long to be remembered, in the way of weather, and of attendance at the several sessions. were furnished both to guests and members, the one worn by the latter being represented in the initial illustration of this article.

A more charming selection of location could not have been made, for grandeur and picturesqueness of scenery, with mountains towering above, four thousand feet high, covered with primeval forests. The Crawford House, itself, is located two thousand feet above the sea, and nothing was left undone by the managers to make



VIEW FROM THE CRAWFORD HOUSE LOOKING TOWARD THE NOTCH.

Transportation arrangements were placed in the hands of Raymond & Whitcomb, tourist agents, Boston, who attended to everything pertaining to their functions in a most acceptable manner. The members and guests left Boston on the 9.30 a. m. train, Tuesday, Sept. 27, and reached destination an hour late, at 6.30 p. m. The return trip was made on Friday, via. the White Mountain Notch, on the Eastern Division of the Boston & Maine R.R., reaching the latter place one hour late, at four o'clock. Badges the visit of the Association one of extreme pleasure.

The first session of the meeting was held in the evening of the day of arrival, in the spacious parlor of the hotel. It was called to order by the president, Stephen A. Knight, who welcomed all present in a felicitous manner. He stated that the financial condition of the Association is better than what it was four years ago. The "Transactions" have been greatly improved and enlarged, and they alone are fully worth the amount of the annual as-

sessments. He referred to the many changes that have taken place in the Association during the last four years, the membership of which has increased from 370 to 536, exclusive of those proposed for membership at the present meeting. The interest in the papers presented and discussions has kept pace with the increased membership, and today, the Association holds a place in the estimation of the business public worthy if its name.

It may be well to say that by far the larger amount of credit for the success of the Association within recent years, belongs to its secretary.

At the conclusion of Mr. Knight's address, S. N. D. North, secretary of the National Association of Wool Manufacturers, was introduced, and read an instructive paper, on

LINEN MANUFACTURING IN NEW ENGLAND, ITS POSSIBILITIES AND ITS LIMITATIONS.

Much has been written recently about the introduction, or the re-introduction, of the manufacture of linen in New England. Some of this literature has been more or less tinged with exaggeration.

The finer qualities it is not to be expected we can make in this country—at least for years to come and only after much experimentation.

Assuming we can, in the course of time, supply all the domestic consumption of linen, we should still have accomplished practically nothing to relieve the situation in the cotton manufacture. Assuming that we could make in Massachusetts all the linen now imported, we should have added to the value of the manufactured products of the state, as returned by the Census of 1895, less than one and one-fifth per cent. That is worth adding; but it is not worth exaggerating. If we are to enter this industry, we must do it for the sake of the industry, and not with the expectation of thereby relieving a congested market for cottons. Moreover, the consumption of linen does not promise to greatly increase, as a result of home development. Unlike woolen, worsted, cotton, silk, and even jute fabrics, linens show no tendency to increased use in any given ratio to the increase in population.

Linen is not, and, because of price, cannot become a substitute for cotton. Cotton is, on the other hand, a substitute for linen in many uses, and in the evolution of the textile industry, is becoming more and more a substitute for linen.

To illustrate, here are samples of crash, made wholly from cotton yarns in one of our Massachusetts mills, in which the linen effect is so skillfully imitated that it needs an expert to detect it, until after several washings at least.

For economic and mechanical reasons combined, the use of linen is coming to be more and more confined to the wealthy. It is a luxury, and a luxury upon whose original province, in one or another form, cotton or silk are steadily encroaching. Its use for underwear, once very wide, has practically ceased.

Cotton can never drive the figured linen damask from the luxurious dining room. Its endurance, combined with its comparatively quick absorption of moisture, renders linen supreme in the towelling of the kitchen and the bedroom.

In its finer forms the linen industry has become a highly specialized manufacture; that it involves small production from machinery and high labor costs; that generations of experience have confined its production to comparatively few centers, and few mills abroad; that it is not adapted to the wholesale productive methods of the American system, and that, if our manufacturers are wise, and careful of the money of their stock-holders, they will be cautious about attempting to rival those exquisite productions of foreign looms, which are the real glory of the linen manufacture.

The cotton mill is the natural birthplace for an American linen industry—for three reasons. First, the cotton loom, both plain and fancy, is adjustable to linen weaving. Second, the

relationship between linen and cotton fabrics is intimate, often to the point of interchangability, suggesting advantages and economies both in the making and marketing of products. Third, the two fibres work naturally in combination, for the production of union fabrics. Indeed, it may be assumed that the first successes, and the most promising results, will come in the making of these union fabrics, such as towellings, sheetings, dress goods, etc. The combination fabric is growing in popular favor: it is clearly the pathway of future development.

This paper was discussed by Percy H. Brundage, New York, and John W. Bell, Andover, Mass., both gentlemen being well informed in matters pertaining to the manufacture and trade in linen fabrics. After the formal transactions had been concluded, the evening was devoted to an informal reunion of the members and guests.

The second session was held during Wednesday forenoon, the first paper presented being that by William Whittam, Jr. N. C., on

COTTON YARN MILL COSTS.

The unit of productive capacity in a yarn mill is the spindle; the amount of possible production being modified by its speed and the number of turns per inch put into the yarn. A mill which has been organized with a proper knowledge of the limits of each machine in the process will have its preparatory machinery so balanced, both as to number of machines of each kind and their speed, that if they all have such attention as to make them produce the number of pounds per week that they ought to, and will, turn off with proper management, there will be no abnormal accumulation or scarcity of stock at any part of the process, always assuming that the plant is arranged to produce some specified range of counts, and that this range is approximately adhered to. That the spinning spindle as the ultimate producer in the yarn mill should always be taken as the base from which the cost of production must be calculated in any correct costing method, is obvious, for if there be an accumulation of roving in the spinning room, no more yarn can be produced than could be spun, if the carding department should just keep up with the spinning department, and conversely; if there be a scarcity of roving in the latter department it is exactly equal to reducing the productive capacity of the mill by just so many spindles as would require to be stopped to keep the remainder constantly in operation, and the expense account would, therefore, be necessarily allocated to this diminished number of spindles.

Should a similar condition exist at any other point in preparatory processes the same method of allocating costs would for the same reason have to be adopted. [As this paper is made up principally of tabulated statistics, we are obliged to omit most of its instructive features.—Ed.]

This paper was discussed by S. N. Bourne, Louis Simpson and John Eccles.

The above paper was followed by one from J. R. Montgomery, on

MERCERIZED COTTON.

The fact that European chemists had for some time been able to produce a lustre upon cotton yarns that rendered them difficult to be distinguished from silk became known in this country about two years ago.

Mercer's process will not produce a lustre.

Mercer's anticipations of the value of his discovery were never realized, for the contractions of the cloth in all directions after passing through his process made them more expensive and the advantages gained were more than overcome by their increased cost of production, so that the process was for many years practically forgotten.

A firm of German dyers, experimenting on some half-silk and cotton goods which they desired to piece-dye, found that the cotton did not take the dye with the same intensity as the silk.

They concluded to mercerize it, and, to prevent the loss in the cotton by shrinkage, determined to put it through the concentrated solution of caustic soda in a strongly stretched condition. Their experiment was a perfect success. They found they had achieved all they desired, and, to their astonishment, that the cotton had assumed a lustre equal to that of silk. They developed this discovery into a process to produce the silk lustre upon cotton now known as mercerized cotton, silkoline, sub-silk, silk-lustre, etc.

An attempt was made by them to patent this process in England but the English Patent Office refused on the score of anticipation, and as there is now no restriction to its use, the process is becoming quite general

To obtain this silk lustre the general method to be pursued is as follows: Skein yarns, warps or piece goods in a stretched condition are immersed in a solution of caustic soda for about twelve to fifteen minutes in a strength of bath about 50 degrees Twaddle. The goods are then lifted, and the surplus liquor is removed either by squeezing the goods through rolls, putting them through the hydro extractor, or any other process to remove the excess of alkali. They are then thoroughly washed with clear water. A sceond bath of diluted sulphuric acid neutralizes all remaining alkali, when a final rinsing leaves the goods in condition for either bleaching or dyeing. As a result of the uniform contraction of the fibre under tension, and of the chemical change of the fibre itself, the goods have a tensile strength of from 15 to 25 per cent. greater than before treatment.

The question is invariably asked when showing this product, is this silk-like lustre permanent? Will it remain after bleaching and dyeing? The reply is that the lustre is permanent and will not be affected by any subsequent treatment.

It is often asked, why does the mercerized cotton take on this high lustre? The best reply to this question is that the cotton, through the action of the caustic soda, is brought to a gelatine or parchment-like condition, the extreme tension rounds and concentrates the fibres so that the rays of light as they fall upon them are reflected instead of being absorbed. The quality and degree of lustre and the silk-like appearance is largely dependent upon the quality of the cotton used.

The coming season will show mercerized yarns in a vastly larger variety of material and styles than last season did. Large ranges of samples have been used in underwear and hosiery, cotton and worsted dress goods, cotton shirtings, half silks, printed light silks, linen dress goods, etc.

This, in some respects, was the most suggestive paper that was presented at the meeting. It opened up a new subject for discussion, one that has received vitality only within the last year or two, but which is destined to become of much greater significance to our cotton manufacturers. No doubt this subject will be taken up at a future meeting of the Association, due to its rapidly growing importance. This paper was discussed by Frederick Lacey, Valleyfield, P. Q., who dwelt especially upon the mercerization of cotton yarn for making bands for spindles. Mr. Lacey has done more or less experimenting with spindle bands made from cotton thus prepared, and has found a strength in favor of the mercerized cotton over cotton that had not been mercerized, in the ratio of 15 to 70. Messrs. Eccles, Simpson, and others joined in the discussion.

The above paper was followed by one prepared by Edward B. Wilbur, and read by the secretary, on

SOUTHERN COTTON MILLS AND MANUFACTURING.

If we were to credit all that is written, describing the advantages of the Southern Mills over their Northern competitors, one would conclude that those in control of Southern mills live in clover the year round, that in order to earn a dividend, all that is necessary is cotton and machinery.

Now what are the advantages we hear so much of, and do they exist to the extent claimed for them by many writers. First is the cost of construction and equipment. Brick mills of the best material and all modern conveniences, have been erected at a cost ranging from 40 cents to 50 cents per square foot, and at a total cost of construction and equipment ranging from $17.00 to $20.00 per spindle, local conditions having been somewhat unfavorable, together with the fact that the machinery cost ten per cent. more than it would in New England. A number of the above mentioned mills were equipped with the latest up-to-date machinery for about $14.25 a spindle, which is higher than the same would have cost at railroad centres in New England.

The development of water power for cotton manufacturing in the South will not be carried on to any great extent in the future, as steam is proving itself much more reliable and fully as economical. If electricity is to become very much of a factor, then this statement will need to be modified. Southern manufacturers have by experience learned that the actual cost of their water power is only to be arrived at when compared to the relative earning power of a steam plant and a water power plant of equal capacity; and, experience has demonstrated that water power is cheaper only under very favorable conditions.

The best Southern mills on print goods with common looms, will have an advantage of two cents per pound over the New England mills using similar machinery. We frequently read in Southern papers of the South's advantage of cheap cotton, estimated from one-half cent to three-quarters of a cent a pound. A mill producing coarse goods will generally use local cottons, and may thereby have this advantage of one-half cent to three-quarters a cent a pound.

But suppose the character of the goods demands a better cotton than is found in the near locality; for instance, if cotton has to be freighted from Arkansas or Tennessee to South Carolina, this advantage would nearly disappear, and if the freight charges on finished goods to New England be added to its cost, the Southern mill is then laboring under a disadvantage.

For ten years the South should make but little effort to spin fine as No. 40s., simply because the help will not have had sufficient experience. Meanwhile there will be little need of the South undertaking to spin finer numbers, as there will be no demand for it; but on print cloth numbers the help will, during this time, develop dexterity not excelled by any class of operatives, foreign or native. That the South will in ten years from now produce, with its native operatives, the bulk of seven yard standard print goods there can be no question.

In weaving departments Southern help will manage successfully as many looms as in any cotton manufacturing country; in spin and card departments, this is not always the case, and is to be expected when one considers the length of time our help have been in the mill; some mills are compelled by circumstances over which they cannot exercise control, to give employment to children of rather tender years. This is the only class of Southern help which are not considered economical, and this is a difficulty which will in time adjust itself.

Our New England operatives point to the low wages paid the Southern help as indicating a low order of intelligence; nothing could be further from the truth. We should remember that these Southern operatives are the children of those men, who for four long years battled for what they thought right; that they lack education in many instances, none will deny; that they are not weak mentally one very soon learns, if he goes among them with any such ideas; they are poor and the cotton factory is to them just what it was to the New England communities 75 years ago, when cotton manufacturing began to be a factor in that section.

That the colored race can ever be

made a cotton mill operative. I most emphatically question, and I regard all efforts in that direction, as certain to result in financial disaster to the parties interested.

I would estimate the present net advantages of white cloth mills in Georgia and Alabama at 30 per cent., divided as follows: ten per cent. for longer hours and new machinery, 20 per cent. for cheaper fuel, lower labor costs, lower taxes and cheaper cotton.

The constant and reiterated statement that the present low price of print goods, is caused wholly by Southern competition, will not bear examination, unless we are prepared to admit that 5,000 Southern print cloth looms, producing 40,000 pieces per week of 28 inches—64x64—7-yard goods govern the price at Fall River of 230,000 pieces similar goods produced on 32,000 looms. It is probably due to the longer hours, and large number of mills on print goods in New England, outside of Massachusetts.

Writers on Southern cotton manufacturing frequently mention our mild winters, and undertake to prove a decided climatic advantage of the South over New England. These writers fail to remember that the heated term of the Southern summers is far longer, and much more severe than that of New England; and that of necessity the operative must have less vitality at its end than those of the cooler climate. I believe that in this respect on account of the severe Northern winters, neither section can at the end of the year show any material advantage whatever, so far as climatic conditions have a bearing on cotton manufacturing. The present advantages which Southern manufacturers have, the full benefit of which is not always secured, are cheaper mill sites, low taxes, cheaper building material, longer hours, lower wages, cheap fuel, cheap cotton when secured in the local market, aided by a low rate of living expenses and necessities of life; and what is of as much importance as all the above, freedom from labor agitators. When the South has thoroughly learned the economies of cotton manufacturing and can finish its own goods, as it should, and will eventually, then, and not until then, will the competition be such as to cause uneasiness.

This paper was universally recognized by members present, as being one of the most satisfactory and impartial presentations of the subject that has ever before appeared in print. It was highly spoken of by the members present from the Southern States.

The session came to a close with a discussion of one topical question relating to the economical range for ring filling frames, used in competition with mules.

The third session was held Wednesday evening, and opened with a valuable paper by Joseph H. Kendrick, on "Manufacture, Use and Care of Loom Harnesses and Reeds." This paper will appear, with special illustrations for this magazine, in a subsequent number. For this reason, we defer giving any space to it at this time.

A paper prepared by Arthur Whittam, of Orangeburg, S. C., was read by the secretary, on "Cotton Grading and Mixing," which will appear, in full, in the November Textile World.

Mr. Whittam's paper was followed by one by Frederick A. Flather, on "Slasher Cylinder Bearings," which appears elsewhere, illustrated. Page 57.

The topical questions that followed the foregoing papers received limited discussion.

The fourth session was held Thursday forenoon, the first paper presented going one by William F. Sherman, read by the secretary, on.

DIFFERENT VALUES OF COTTON MILLS.

In these days of close margins or no margins in cotton manufacturing it has become quite a common thing for mill owners and managers to seek reductions in assessed valuations for

taxation, and questions frequently asked of mill engineers by manufacturers, and even in the court room, show that a clear understanding of the different values of a cotton mill is by no means universal. Anyone who supposes there is but one value for a cotton mill will soon discover, by giving a little study to the problem, that it is not so.

Intelligent insurance on manufacturing property should be arranged in conformity with the methods adopted to ascertain the amount to be paid after a total loss by fire has occurred. Too many cases in past years have been aranged without sufficient care, leaving the close and careful computation to follow the loss.

Now an underwriter's computation of values has nothing whatever to do with original costs of the plant, unless perchance such original values happen to agree with the conditions at the time of computation, which seldom occurs.

Neither has an underwriter's computation anything to do with the relation of the buildings to the machinery, that is whether the buildings are well designed and arranged or otherwise for the work to be done in them, whether a well balanced or a poorly balanced plant all through, and of course land and foundations are never included.

In the standard forms of policies adopted by most States it is stipulated that "All losses shall be estimated according to the true and actual value at the time the same shall happen" and this is taken by our leading underwriters to mean the cost of replacing the property with a credit for a just and fair amount for the depreciation for the use already had of it, and this without regard to what the property may have cost five, ten or twenty years before or whether a building after modern methods could be made to cover the machinery for less or more than one like that burned.

As to valuations for taxation. Assessors' duties are defined in most State statutes to be to assess property according to its true cash value on the first day of May. A broad expression is it not, about which honest men of good business judgment may differ. The best definition of "true cash value" is, we think, the following: "Such a sum as a party having the requisite capital and desiring to buy is willing to pay for the plant, the owner being willing but not forced to sell."

The saleable value must depend very largely upon its earning capacity in able hands, while insurance valuation has nothing to do directly with earning capacity or its market value.

Mr. Sherman's paper was followed by one by Chas. H. Fish, on

POSSIBILITIES OF A NEW METHOD OF DRYING FABRICS.

In mills, print works and bleacheries where large amounts of cloth are dried there is always a considerable amount of power used, and as a rule it is found to be of advantage to utilize the steam for generating power before it is used for heating and drying.

Probably the most successful method is to exhaust steam from all the engines of the plant, into a low pressure system of piping in which a pressure of about ten pounds gauge is maintained, and to take the steam required for drying from this system. In this way a considerable amount of low pressure steam is had at a reasonable cost. The actual cost of the steam per pound may readily be calculated for any case, where the data is at hand. To illustrate this, let us take a factory which uses 1000 h. p. for power, and which requires for drying and other purposes 30,000 pounds of low pressure steam per hour. For the sake of simplicity we will assume that the 1000 h. p. is developed in one engine. We will adopt a high pressure engine exhausting into a low pressure system at ten pounds back pressure. We must exhaust into this system 30,000 pounds of steam per hour, and it only remains to adopt an initial steam pressure which will enable our engine under these conditions to develop 1000 h. p. We next must find what it would cost to develop this 1000 h. p. with the

most modern compound or triple expansion condensing engines running under favorable conditions. This cost would include interest on the investment, proper charges for fuel, depreciation, taxes, repairs, supplies, attendance, etc. Against this figure set the corresponding figures for our original simple plant, running with the ten pounds back pressure. The difference in the yearly cost of operating the original plant and that of the assumed plant will give us the annual cost of the low pressure steam, and from this we can obtain the cost per pound.

In most instances it will be found that the cost of the low pressure steam obtained in this way will be so much lower than the cost of high pressure steam, that the use of the latter will not be feasible.

This paper developed some new points of much apparent value in the drying of fabrics. It was pronounced by the members as touching upon new and excellent points worthy of consideration. The new method greatly impressed the members.

Mr. Fish's paper was followed by one by Alfred E. Adams, on

THE IMPORTANT FEATURES RELATING TO RING SPINNING, AND THE COST OF SUPPLIES FOR PLAIN LOOMS.

Having tested many styles of travelers under varying conditions on various sizes and makes of rings, my experience is that a very wide traveler and small circle gives the best results. The wide wire stands more erect and runs more smoothly. At a speed of spindle approaching or exceeding 10,000 revolutions, a wide traveler demonstrates its advantages over a narrow traveler. In all the tests which I have made, the square pointed traveler has given the best results.

Good running spinning and good yarn are not entirely dependent on the ring traveler. The ring is another equally important factor.

The very high speeds at which many are now running machinery make it necessary that machinery should be more perfectly built, and when set up in mills, correctly adjusted. A higher speed of spindles for ring spinning is obtainable and practical. Twelve thousand revolutions is not above what spindles ought to run on medium and fine counts. To do this successfully, improvements can and must be made in building the ring frame. All spinning frames should have adjustable feet for ends and sampsons. This would simplify the leveling and cause it to be be done more frequently. No one doubts the importance of keeping the machinery level.

Top rolls might be improved and made to run more smoothly. This would apply to all machinery on which top rolls are used. It is possible that a shell roll having ball bearings will come into use. Such a roll would need no oil and would run smoothly. Tests have been made which showed very marked improvement in the evenness of the yarn. With such a roll 50 per cent. of the weight could be done away with, power would be saved, or an increased speed obtained without increasing the power. Ball bearing rolls have been in use for over two years on fly frames and the results have been excellent. Tests show a large saving in roll covering, at least ten per cent. in power, and smoother work.

Spindle banding, in my opinion, needs careful attention. We can waste power and wear out our spindles very rapidly if the banding is not properly made and put on the spindle with some judgment as to tension and the proper tieing of the knot. A large band is not necessary, especially when spindles are properly lubricated with a light and good quality of oil, and the spindles removed from the bolster casings and bolsters cleaned at least once in two years. I have this done oftener. With a proper system, it will be very little trouble and no additional expense to give spindles the best of care. I have had many inquiries about my small bands and how such good results were obtained. Those inquiring have sent me samples of the bands

which they were using and the results obtained by them. It was interesting to note the difference in different mills using the same spindles under nearly the same conditions. One party was using 60 pounds of banding; others 42, 31 and 20 pounds per thousand spindles per year. Weight of bands was from 50 to 110 per pound. In one mill, they were using sperm oil on their spindles. In this mill the pull on the band was from 12 to 16 pounds. The bands were very large in this case. Spindle banding in some mills certainly needs investigation.

Owing to the time occupied by the reading of the formal papers, but little attention was given to the topical questions.

The last session of the meeting was held Thursday evening, the session being opened with a highly interesting paper by Hon. W. C. Lovering, on "Some Newly Discovered Advantages of the Round Bale." This paper was listened to most attentively, an idea of the round bale being given by the exhibition of one of these bales unrolled, so that the members could see the readiness with which it can be utilized, and the excellent condition of the cotton, in a form ready to be put upon the picking machine. This bale was the subject of considerable discussion long after the session came to a close.

The paper that was on the program, on "The Early History of the Power Loom," had not been completed by its author, and will appear only in the printed transactions of the Association.

A paper was now read by James G. Hill, upon

THE RELATIONS BETWEEN STEAM AND WATER POWER.

In general, it may be said that any water power furnished without charge, except that of building the plant and the expenses of maintaining the same, is cheaper than steam power or any other known power.

Of course we know that whenever water power is furnished by a separate company, distant from the mills, at a fixed or variable charge, water power may soon become an expensive luxury.

I assume that the average water and steam power plants will cost about 50 dollars per h. p. each.

The statement has been made that steam power at tide water is as cheap or possibly cheaper than water power inland, and of course, if true, the advantages in freights and the nearer proximity to commercial centres is apparent.

But I think we can show that no steam power, no matter how cheap coal may be, is as cheap as water power without charges, other than those incidental to its production, that is to say, without any fixed charges for the use of water power.

I have assumed the life of a water wheel to be about thirty years and a steam engine about twenty years, while the life of a steam boiler is placed at about ten years only, because with the present high pressure of about 150 pounds per square inch or more at which modern boilers are run it is questionable whether it is prudent to risk a longer life.

The topical questions that were on the program for consideration at this time were omitted, to be taken up, if thought best, at some subsequent meeting. The final paper that was presented was one by John H. McGibbons, Director of Exhibits for the Paris exhibition of 1900, on

AMERICAN TEXTILES AT THE PARIS EXPOSITION OF 1900.

France will make the coming exposition surpass all others in every particular except size. It is the purpose of its projectors to make it symbolical of the greatness of the closing century.

So great is the interest in the exposition that already all but two of the more than fifty nations have applied for space. Even Germany, for the time being, has suppressed her feel-

ing of animosity towards her most bitter enemy, and, having been allotted space, will make a peaceful invasion into France in 1900 and set up the most attractive display in the exposition that money and skill can produce.

As an advertisement the exposition will afford all American producers such an opportunity that they will err who do not accept it.

Although the United States may not now be able, owing to duties and home demands, to obtain an extensive foreign market for certain goods, the display from this country in all lines should be none the less in keeping with their actual development in this country.

The demands already made for space in the American sections give the assurance that our exhibit in nearly all the departments will not be excelled by those from any other country. By such an exhibit we can best reach our South American friends, who continue to go to Europe to buy, through force of habit and through lack of perfect knowledge as to what we actually have to sell.

The space allotted to the United States for threads, textiles and garments, is limited, amounting approximately to only 13,000 square feet, but a joint exhibit of the cotton manufacture would reduce the amount of space necessary and at the same time insure a more attractive and satisfactory exhibit

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The following were elected for active and associate membership:

For Active Membership: Isaac. A. Brown, Treasurer Narragansett Mills, Fall River, Mass.; William W. Crapo, President Wamsutta Mills, New Bedford, Mass.; Philip Dana, Superintendent Dana Warp Mills, Westbrook, Me.; Samuel Dibble, President Enterprise Cotton Mills, Orangeburg, S. C.; John Gilligan, Manager Fort Mills Manufacturing Co., Fort Mills, S C.; Edward B. Jennings, Treasurer Globe Yarn Mills, Fall River, Mass.; C. Prescott Knight, Manager River Point Mills, River Point, R. I.; Webster Knight, Manager Natick Mills, Natick, R. I.; R. M. Miller, Jr., Vice-president The Atherton Mills, Charlotte, N. C.; William C. Lovering, President Whittenton Manufacturing Co., Taunton, Mass.; J. R. Montgomery, President the J. R. Montgomery Co., Windsor Locks, Conn.; Benjamin Phipps, Treasurer Clarendon Mills, 4 Winthrop Sq., Boston; John R. Rostron, Superintendent Indian Head Mills of Alabama, Cordova, Ala.; and William P. Vaughan, Agent Putnam Manufacturing Co.

For Associate Membership: Fred W. Bushnell, Mechanical Superintendent Narragansett Electric Light Co., Providence, R. I.; James H. Kendall, of Edward Kendall & Sons, Cambridgeport, Mass.; George C. Newell, of Starkweather & Shepley, Providence, R. I.; and H. T. Schaefer, Sterling Coal Company.

Scientific Investigation of Cotton.

Views of Dr. F. H. Bowman on the suggestions advanced by Edward Atkinson for ascertaining the cause and the nature of the injury to the cotton fibre, and the remedies therefor, from the cotton gin to the finished fabric.

Editor Textile World:

I submitted a proof sheet of the article printed in the September number of your magazine, on the proposed investigation of the cotton fibre, to Dr. F. H. Bowman, whose works upon the cotton and wool fibres are well known to you. He may be esteemed the highest authority. I now submit to you his comments upon the subject, by which it will appear that I have been justified in quoting him as authority for an average depreciation of the cotton fibre of seventy-five per cent. in ordinary practice, although that statement does not appear in his work upon cotton. You will remark that he thinks we may not get more than thirty to forty per cent. of the original strength of normal fibres in the yarn in our common practice. I am inclined to believe that we shall make a greater improvement than would be indicated by that judgment and that we may save forty to fifty per cent. of the strength of normal cotton, because I believe our present practice in opening and picking is not equal to the average English practice. I give this judgment on the ground of improvements already accomplished, but not yet ready for submission to the public, yet of such a nature as to warrant the expectation of an increase in the strength of a number twenty-four yarn from our present standard of good yarn, by more than thirty per cent. That improvement has been made by changes in only one department in the factory in which injury to cotton occurs.

EDWARD ATKINSON.

Boston, Sept. 13, 1898.

VIEWS OF DR. F. H. BOWMAN.

I was pleased to receive your letter and remarks in regard to the suggestions for the scientific investigation of the injury done to cotton during the process of manufacture.

As regards myself, I have now entirely ceased to be actively engaged in the cotton trade, though I still have a monitory interest in it and am now entirely giving my time to the chemical trade and to electrical and chemico electrical work.

With regard to the injury done to the cotton fibre in the process of manufacture, I think it would be better for me to give you my views without altering anything in your paper.

My experience showed that the same cotton was stronger when ginned on roller than on saw gins, but as I had not the opportunity of seeing the cotton ginned, I had to take the samples that were sent me on faith, although I have no doubt they were correctly marked, one sample on saw gin and one sample roller ginned. Under the microscope, there was no doubt about the injury done by the saw gin, as there were far more frayed edges to the fibres and more broken fibres from the saw gin than from the roller gin, and every injury to the fibre necessarily weakens the yarn. I also found from experience that the less beating in the opening and scutching machines that was given to the cotton, just enough to clean it, the better it was for the fibre; and also that excessive speeds in the beaters were much to be avoided. I made experiments with sending the cotton through two beaters, and found a decided improvement with the two over the four in the strength of the cotton; and I also found that slow speeds were the best, the beaters never being run above the speed that was necessary to clean the cotton and take the seed and leaf out of it. Long stapled cotton was especially injured by excessive beating. I cannot, however, give you exactly the percentage of gain, because I did not test the fibres with my testing machine, fibre by fibre, but passed the scutched cotton on into the process separately and then tested the yarn after spinning.

Great injury is done to the fibre very frequently in carding, and although diamond, chisel and needle-pointed cards greatly increase the quantity of work that can be got through the carding engine, they are not good for the cotton, unless great care is taken, because an examination of the fibres after passing especially through the needle-pointed cards reveals that many of the fibres have been split longitudinally, and thus the fibre must be injured in its strength.

In addition to this, excessive speed of the cylinders in carding ought certainly to be avoided, and the slower a card can be run to do its work, the better will be the state of the cotton after it is carded; and well carded cotton is the crucial point in spinning, next to the drawing. The cotton is very frequently injured in drawing, and there is no doubt that the less drawing that can be given to cotton, provided that you can get it even, the better; and this is the reason why low drafts are very advisable as against high drafts and light slivers as against heavy ones. If the rollers are not exactly set to the length of the cotton, very great injury may be done here, and this is especially the case with fine, long cotton, all of which are much more apt to be injured than that with short staple. The same thing applies to the slubbing, roving, and jack frames, where the setting of the rollers is all important, and you may make a large percentage of difference in the strength between having the rollers properly set and badly set.

Excessive twist in the rovings ought also to be avoided, as this holds the fibres in the drawings and they are then torn asunder instead of drawn, and the same applies to the fine rovings in the mules or frames. It ought to be made a cardinal point in spinning to have the finest rovings possible, the least twist and the lowest draft. The question of the tempera-

ture of the rooms and the amount of moisture in them, and the quality of the leather on the rolls, makes a great deal of difference also in the strength of the yarn, because, if the cotton sticks to the roller in the drawing and is not drawn out freely, the microscope will soon reveal the injury done to the fibre.

I have told you that between the absolute strength of any individual fibre, taken as a unit, and the yarn made out of a number or those fibres, there is generally a loss of at least seventy per cent. in strength. The cotton fibre is really a strong substance, when fully ripe and in good condition, and if we could have a cotton fibre, the same strength as an ordinary first-class fibre fully ripe, and get this fibre, say, with a cross section of a square inch, it would bear very favorable comparison with a rod of the same sectional area of steel. But it should be remembered that quite apart from injury to the staple in the process of manufacture, the ordinary cotton thread is a compound body, which is built up of many fibres twisted into each other, and you can never get the contact of the fibres with each other the same as if it were one homogeneous mass of cotton cellulose; and from experiments I made, with the greatest care possible, I do not think that we can ever hope to get more than from thirty to forty per cent. of the original strength of the fibres into the yarn, unless some process is discovered by means of which the fibres can be cemented, as well as twisted, together. But in this case, of course, elasticity would be lost, and the dyeing qualities very greatly impaired, which would make this process impracticable, although, at one time, I made many experiments in this direction with a view of increasing the strength of plain cotton threads for sewing purposes. Of course, in sewing threads, the polishing of the cotton with very gummy substances does effect a great increase in the strength.

The whole secret of strength in yarn may be summed up as follows: Use only perfectly ripe cotton to begin with, for if you have bad raw material to start with, you never can have good yarn to finish.

Second: Subject the cotton to the newest possible process in attaining the results you desire, and avoid all undue rough usage, and this means, as far as possible, slow speeds rather than fast ones.

To carry out a series of experiments on the lines that you suggest would probably enable you to determine the injury done in the various stages, but I think that for practical purposes, since we now know where and how the injury occurs, if we set the machines as I have indicated, we shall get the best strength possible out of any good cotton without the trouble of investigating the separate details.

FRED'C. H. BOWMAN.

The Prior Roller Cotton Gin.

There appears in our advertising columns illustrations and claims of the Prior roller cotton gin. They deserve attention because of the merits of the machine in many of its essential features, which made it the object of considerable interest at the last spring meeting of the New England Cotton Manufacturers' Association. The machine has been seen in operation by a number interested in improvements for the ginning of cotton, and has been favorably commented upon.

The inventor claims for the new gin, that it will handle the longest and shortest staple with equal facility, and in equal quantity to the saw gin; and while the saw gin tears the perishable fibre roughly from the seed, the new gin gathers the tender staple and detaches it gently and thoroughly, and so easily that the natural length of the fibre is retained absolutely. From the experiments made of the new gin by some of the best judges of cotton, the claims of the inventor seem to be carried out.

The great difficulty heretofore in the roller gin, seems to have been with the roll, which had not the requisite

tenacity to take the cotton properly in its different conditions: the roller of the new gin seems to have been invented with an eye to these difficulties and it is claimed that it will gin cotton of all conditions equally well.

The new gin requires it is stated by the makers, but about one-third the horse-power requisite to drive the saw gin, and unlike the latter has no motes or picker waste, an immense saving, when the entire crop of the South of 10,000,000 bales, or more, is taken into consideration.

Fire is an impossibility in the new gin, from its own action and all sorts of trash, metal, etc., may be thrown into the machine and will be promptly "kicked" out with the seed and other extraneous matter.

The entrapped air, which is a common feature in the cotton coming from the saw gin is missing in the roller gin, the cotton coming from the gin in a compressed lap, which, laid lap by lap in the gin box and put under the ordinary screw press, comes out as dense as the saw gin cotton from the second compress.

The new gin can be fed from any of the existing automatic feeders, so that the cost of putting our common green seed cotton through the roller gin will not exceed that of putting it through the ordinary saw gin.

In ginning on the Prior machine the cotton is thrown into the hopper upon the moving feed apron, and directly upon an exposed part of the roll, which seizes the fibre, carrying it toward the presser-blade where it is met by a plunging comb which pushes back the seed and foreign particles, allowing the pure cotton to pass underneath the presser-blade while the seed and other substances are expelled from the machine over the presser-blade.

The cotton is then carried around by the roll until it meets the underneath brush which removes it from the roll, allowing it to fall upon the moving screen which permits the sand and leaf particles to sift through, the cotton then being carried between the compressing rolls in a bat on a movable apron to the press.

The offices of the company are in Philadelphia, The Prior Cotton Gin Co., 927-929 Chestnut St.

Sheep in Queensland.

The sheep earliest introduced into Queensland, Australia, were of Saxon-merino origin, having been selected from the Brindley Park flock, Merriwa, New South Wales, and taken to the Darling Downs by the late Frederick Bracker for the North British Australasian Company's station, Rosendal, near Warwick. From this selection several of the finest flocks in Queensland had their origin, notably the Glengallan, which was afterwards brought to the front as one of the best flocks in Australia by the late Mr. John Deuchar.

From about 1839 to 1869 large numbers of merinos were imported from Germany of the Saxon-merino and Negretti type principally by the North British Australasian Company, John Deuchar, F. Bracker and others. During the same period large numbers of superior Saxon and German merinos were imported for speculative purposes; and it is worthy of notice that the high-priced Queensland clips of the present day trace their origin to these German merinos. In 1869 a few Rambouillet sheep were imported but their identity has long since been lost in the flocks of the Burnett district, into which they were introduced. When the importation of German merinos ceased, a large number of the wool-growers introduced the blood of the Victorian fine-combing merinos into their flocks; but although admirably suited to the humid climate of Victoria, they were totally unsuited to the more arid climate of the northern colony. A native of Tasmania introduced, about 1870, some valuable Tasmanian merinos, and his success with that type of sheep was so marked that in the course of a few years he established for himself the reputation of possessing one of the most valuable flocks in Queensland. Victorian sheep had been first tried, but the climate and conditions of life in Queensland did not suit them. They deteriorated

rapidly, grew bare on the points, weak in the staple, and uneven and faulty in the fleece. It was then that the Tasmanians were tried, with the success mentioned.

It should be noted that at the time many of the Queensland "runs" were stocked, the owners had to be content with "culls" from New South Wales flocks, and the work of amelioration was in consequence very greatly retarded.

For many years it was the general opinion amongst sheepbreeders in the southern colonies, and amongst naturalists in England, that fine wool could not be grown in Northern Queensland: that the tendency of the climate would be to deteriorate the wool to such an extent that ultimately the sheep would produce hair instead of wool. The experience has not sustained that opinion. Some of the best and soundest wools in the colony are grown on the higher country drained by the Flinders River.

The importance of the Queensland grown wools for manufacturing purposes has long been recognized, and some of the principal clips have established reputations which place them in the first rank of the world's wool brands.

The shearing in Queensland differs from that of the other colonies in that in one part or another, it goes on nearly all the year round. For instance, some of the very large sheds in the Central District commence at the end of January or the beginning of February, which is just about the time that other large stations which commenced in August, September and October, are sending the last of their wool to the seaboard.

The Cylindrical Cotton Bale.

NEW YORK OFFICE OPENED—150 COMPRESSES IN OPERATION.

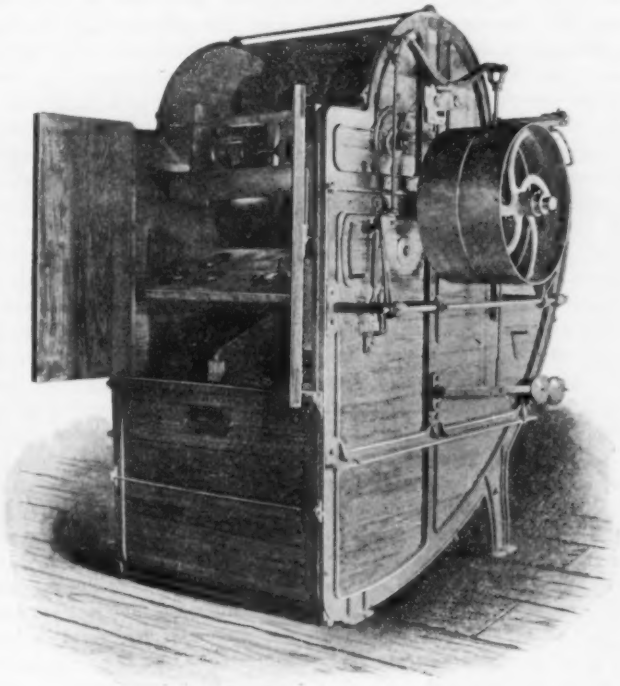
The American Cotton Company, John E. Searles president, which controls the new cylindrical system for baling cotton, recently installed its commercial department, which was previously in St. Louis, in rooms Nos. 11 and 12 Cotton Exchange Building, New York City, a part of the commodious quarters heretofore occupied by Inman, Swann & Co. John Martin, formerly at the head of one of the largest cotton houses in the South, has charge of this special cotton department of the company's business. This company has for several years been quietly establishing in all the cotton-growing states its cylindrical compresses, which turn out compact, symmetrical, practically non-combustible cotton bales, which for neatness, space-saving and economy in handling present a striking contrast side by side with the misshapen, nondescript "hunks of cotton" erroneously called square bales.

With 150 cylindrical compresses now in operation, whose output is eagerly taken by American and foreign spinners at a higher price than other cotton brings, this company has demonstrated its ability to bring about a far-reaching reform in the packing and handling of a commodity in the production of which this country has almost a monopoly. "Its operations," said Mr. Martin, "have heretofore been designed to prove to spinners the superiority of this form of packing cotton, but with this fact now universally admitted, and with largely increased orders from those who tested the round bale's merits last season, and with the mechanism employed in the process now absolutely perfect, the scope of the company's operations will be aggressively extended. While the cotton department will be operated in these offices, the financial affairs of the American Cotton Company will be conducted at a separate office, No. 1401 Lord's Court Building, under the supervision of Winthrop M. Tuttle, an officer of Troop C (cavalry), of Brooklyn, who has just returned from active service in Porto Rico."

—Under the term "fancy yarns" are included all varieties of threads whose composition is of an irregular or variegated character, and which are designedly made so.

New Universal Fulling Mill.

We take pleasure in illustrating herewith, the 1898 pattern of this well known fulling mill, made by the Rodney Hunt Machine Co., Orange, Mass. For capacity and rapid fulling, this mill has no superior, being equally well adapted for heavy and light goods. Comparatively speaking, it takes up but little space, and requires but a small amount of power. The bearings are self-adjustable and removable, and are on the outside, obviating the dripping of oil on the inside of the mill. The power is transmitted by friction, or tight and loose pulleys.



The mill is made in two sizes. The one illustrated represents that known as the No. 2 mill, which is four feet wide, has two sets of rolls, and a six-ring guide plank, with a capacity of nearly twice as much as the mill known as mill No. 1, which is three feet wide, for one, two or three strings of extra heavy goods, one, two, three or four strings of medium goods, and one, two, three, four, five or six strings of light goods, with one set of rolls and a three-ring guide plank.

These mills are made extra heavy, being of the best material, and the workmanship first class. The adjustable brass mouth pieces and stretcher also packing boxes and stop motion, are of the best construction.

The Rodney Hunt Machine Company is among the oldest and best-known builders of machinery for wet finishing, and in the course of its long business experience it has introduced many and important improvements in the construction of its specialties, which have given its productions a high reputation among manufacturers, and the universally high favor which this new fulling mill is receiving wherever it is introduced insures a very large and extensive sale for the machine. It is also an extensive builder of turbine water wheels, and its productions are illustrated and described in its catalogue of turbine

water wheels and woolen machinery, which may be obtained free by addressing the Rodney Hunt Machine Company, Orange, Mass., where its main office is located, and where it has an extensive plant fully equipped with special machinery, or it may be addressed at its Boston office, 70 Kilby Street.

Felting in Wool.

The process of felting is not by any means as simple as most writers assume. On the contrary, it depends upon several both intrinsic and extrinsic causes, and instead of resulting merely from the interlocking of the superficial cells of adjacent fibres, it must be regarded as the outcome of a series of modifications in the structure and composition of the fibre. We must therefore dismiss the conclusions of Mr. Youatt upon this question, and look in other directions for the causes. The primary requirements of a good felting wool, are: (1.) A large number of fusiform cells with extremely thin and elastic walls which respond very readily to the influence of water and permit of its free absorption into every portion of the fibre. (2.) The cells must be small so as to impart the necessary flexibility and elastic nature so as to enable the fibres to readily intermingle and mat together. (3.) Its constitution must be more of the nature of gelatine than horn, so that when submitted to the action of hot water, assisted by acids and alkalies, the cell walls are softened, and the fibres readily adhere. It is a well-known fact that under these conditions the felting capacity is very materially increased, and as seen in the case of hard felt, appears to be almost without limit. If, however, it is solely dependent upon the inter-locking of the individual serrations, it is hard to understand how this can be, since it is impossible for the points of the scales to penetrate beyond the cuticle, which, therefore, limits the extent of felting and shrinkage. In the first instance, two essential features must be borne in mind—viz., the presence and influence of moisture, and the shrinkage which always results from the felting. To ignore these is to miss the crucial part of the problem, because their universal presence in every instance shows that they are intimately connected with the process. Further so far as my microscopic investigations have proceeded in this direction, it would appear that when the fibres are saturated with hot water the imbrications do not readily lend themselves to interlocking, owing to the tips of outer cells or scales becoming soft and swollen and bending more towards the shaft of the hair. Under these circumstances it is difficult to see how they can penetrate between each other. Further, since extreme felted goods are obtained by using a hot acid solution, which greatly facilitates the operation, this places another obstacle in the way of Mr. Youatt's conclusions, because since both acids and alkalies act upon wool, especially when they are heated, gradually dissolving the cells, we must admit that the exterior of the fibre will be the first to be injured, thus removing the serrations, which ought, therefore, really to prevent any felting taking place, whereas it becomes more pronounced. To what, then, can the property be assigned? In the first place, I am inclined to regard it more as a chemical than a mechanical phenomenon, owing to the fact that however much we may agitate and entangle perfectly dry wool, it never becomes felted in the true sense of the term. We know that absolutely dry wool fibres have no attraction for each other. Every fibre mutually repels its neighbor, thus being what is termed "electrically negative;" but this disappears as moisture is added, until they begin to attract each other or become "positive." This is well known to most carders and spinners, and so strong is the attractive force that the greatest difficulty is experienced in drafting wool containing an excess of water. The combined action of hot water and acids causes the cell walls to soften, change in form, and adhere more closely together, this becoming

more pronounced where pressure is applied as well. Under these circumstances the cells and fibres lose their individuality, and become practically fused together into a more or less homogeneous mass.—W. W. Buckley in Textile Manufacturer.

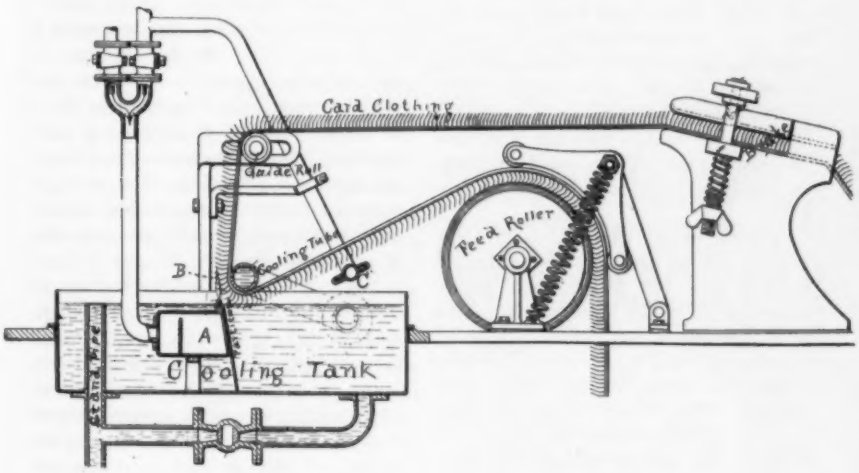
—In buying fine wools for combing purposes a man gets a continuous line of thinking in a very definite order. He looks at a lot of combing wool, and has first to make up his mind generally as to its quality. If that is satisfactory to him, the next thing that he thinks of is, what percentage of wool at which he is now looking will he get of the particular quality that he wants, in sorting his fleeces. While he is possibly talking about something else he is making an investigation that is settling in his mind that important question to him, whether it is 60 or 75 or 85 or 45 per cent. of these fleeces that is going to come out of the particular quality he wishes to get.

—Cotton hairs, besides the advantage of being unicellular, have other structural features of great importance. From the base of the hair to near the apex, in cells that are fully matured, it is found to be more or less a collapsed tube.

Hardening Points of Card Teeth.

Many of our readers undoubtedly know how the points of the teeth of card clothing are hardened. Many carders are familiar with the usual processes for obtaining this result, still there are many, no doubt, in the card room, who have little or no idea of how this is accomplished. To these latter, the accompanying illustration will be of peculiar interest, as showing a method recently devised by a German.

This apparatus is for hardening the points of carding teeth, by first glowing, then cooling, and finally drying the teeth while the body of the band is cooled during the time the teeth are glowed. In this way, it is claimed, a superior quality of hardening is obtained.



The drawing which we give, is a vertical or longitudinal section of the apparatus, which will require but little explanation in order to convey an idea of how the hardening is accomplished. The card band, or clothing, is first engaged by a brake mechanism, to give the proper tension. The card band then passes over an upper adjustable guide roll and over a lower hollow cooling tube, directly over a cooling tank, and is finally engaged by a feed roller driven in a suitable manner. The cooling tank is

divided into two compartments by a partition. The forward compartment contains the cooling or hardening water, or other liquid. From this compartment the bath overflows the partition to fill the rear compartment, and cool the reservoir "A" of a Bunsen burner, "B," contained therein. A stand-pipe is arranged with its mouth above the level of reservoir "A," so that the latter is always submerged.

At the lower end of the forward compartment, there is a drain, as will be noticed.

The guide roll is horizontally adjustable, so that the angle at which the card is fed to the cooling tube, and the length of the way which the carding teeth describe through the flame may be increased or diminished at pleasure.

Reservoir "A" is supplied with a mixture of compressed air and gas through a pipe, so that ample oxygen, to insure perfect combustion, is provided.

In order to dry the card teeth after having passed out of the hardening bath, a tube "C" is arranged, perforated on its upper side, and supplied with compressed air, which is ejected against the card teeth, which are still somewhat warm, drying them very rapidly. The card band is held against the feed roller by means of friction rolls, as will be seen by referring to the drawing.

Wool Market.

For the last month, the wool market has ruled extremely quiet in all lines. The trade, however, has been hopeful all along, and the raw material has been looked upon as good property to hold, especially on fine grades, which are relatively enhanced in value from year to year, and unless a change in the growth of wool is brought about in the wool growing countries, there will be a famine of fine merino wool before five more years go by. We predicted this state of affairs eight years ago, when the disposition was strong for crossbreds and the negligence of merino sheep. The light weight business has been disappointing to manufacturers, and although the prospects are favorable, still there is apparently nothing for immediate encouragement. Some mills are running over time, and one mill has a conspicuous advertisement in one of the Boston dailies for men weavers to operate looms during the night. These instances, however, of overtime employment are in spots only. The position of foreign wools seems to be better than that of the domestic article. The prices abroad are relatively better than in this country. A considerable amount of Australian and other wools have been re-exported, where one to two and a half cents can be realized, more than what can be obtained in our domestic markets. Ohio XX and above fleeces may be quoted at 29 to 30 cents. Carpet wools are in good demand. Territory wools are receiving moderate attention. The most interesting feature in the Boston market during the past month, was the sale of wool at auction by the Underwriters' Salvage Co., consisting of California, Arkansas, Texas, Cape, crossbreds, Australian, etc., taken from the store houses at Ballardvale, Mass., and the Atlas Stores, Boston, all of which have been scoured, sorted and graded. The wool was sold on account of the insurance companies upon which claims existed for wool that had passed through fire. The prices obtained were generally considered to be satisfactory, sustaining market values.

Wool in ware-house July 31, 1898, in the United States, was sixty-two million pounds, sixty per cent. of which was carpet wool. The amount in ware-house July 31, 1897, was 583,000 pounds.

Cotton Market.

We quote middling uplands, at present writing, at 5 9/16 cents, against 5 3/4 cents last month. Manufacturers and the trade have entered upon this season with a large visible supply of cotton, with the prospects of

another enormous crop, which will give an ample amount of the raw material, which is likely to be of such a weight as to carry prices to a very low level. Much will depend upon the length of the picking season. The policy of spinners is to keep away from the market other than to supply their immediate wants. This is as true abroad as it is here. The belief is quite general that cotton planters made something out of their last year's crop, notwithstanding the low prices which they were obliged to take.

According to the late government crop report, there has been a slight improvement in the crop in the Eastern portion of the cotton region. Rotting and shedding are decreasing; the bulk of the crop is open and picking is progressing rapidly. In the central portion of the cotton region, picking is progressing as the weather permits, but shedding, rust and worms continue in Mississippi and caterpillars and worms are again damaging the crop in Louisiana. Some damage has resulted from heavy rains in Arkansas. In Texas the bulk of the early crop is open and picking well advanced, although pickers are scarce in some localities. The reports indicate that the top crop will be short in South Carolina, Georgia, Oklahoma and Texas.

While Southern mills have taken as much cotton since the first of September as they did last year, the Northern mills have not laid in more than one-half of their last year's takings. The surplus stock in the hands of spinners in Great Britain and on the Continent, on the first of September, was estimated to be very considerably more than at that time the year previous.

Cotton Mills and Spindles in India.

ALL INDIA.	1896	1897
Number of Mills	155	173
Spindles, ...	3,932,946	4,065,618
Looms, ...	37,270	37,584
Consumption of Cotton (Bales), . . .	1,469,318	1,300,936
Operatives Employed, .	145,432	144,335

—This question of the drying of wool is one of much greater practical importance than is commonly supposed. Wool dried in the open air will always yield an article of higher quality than can be obtained from the same wool when dried by means of artificial heat. A case in point was recently brought under notice by a local manufacturer of felt hats, who stated that he could always produce a better quality hat in summer than in winter from the same raw material. Enquiry elicited the fact that it was the practice in these works to dry the hat bodies in the summer by placing them in an open shed, whereas in the winter season they were dried at several stages of the manufacture, on gratings placed over the steam boilers. This fact sufficiently explained the variable result obtained.

—If one is selecting fine wools, the very first question raised is whether the wool is being selected for carding purposes or is to be combed. The people who do the buying of wool for carding have certain points in mind, which, while they may be in a rather indifferent way considered by the man who is buying wools for combing purposes, are not the main points in his mind. He who is buying wool for carding purposes has the thought, chiefly, whether the wool that he wants is a wool for warp or filling purposes; and what his decision will be as to the fitness of the wool will be governed very considerably by that. As most of his other questions are the same as those considered by the buyer of combing wools, we may pass to consideration of that business.

—The differential motion on a roving frame is for the purpose of regulating the speed of the bobbin as the roving is being wound on it. What is wanted is, that the surface speed of the bobbin shall be exactly the same, whether the winding is proceeding on an empty or a full bobbin. To do this the revolutions per minute must be altered for every layer of roving wound on.

COTTON DEPARTMENT.

Practical Cotton Designs.

Fig. 1 is an idea for shaft work, intended to be worked on not more than 16 shafts. The black squares (■) represent solid floats of weft, and the cross portion (✠) a three weft and one warp twill, whilst the light portion (□) may be worked up with either

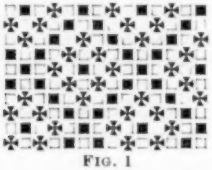


FIG. 1

warp twill or plain as desired. The whole, if worked out as above, will give a satisfactory result.

The constant search for novelties in cotton brocades still keeps up the demand for fancy weaves to form the groundwork of designs which may be more or less elaborate in themselves, but no matter how elaborate the figure may be there is a general desire to get away from fabrics having nothing but a solid satin weave for the

FIG. 3.

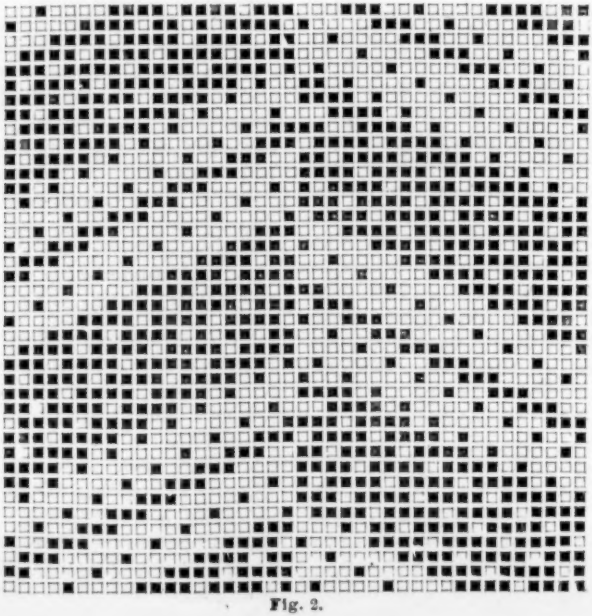


Fig. 2.

groundwork of the design. No matter how different the figures may be there is always a general amount of sameness in a large collection providing the designer has not used the craft at his command in producing some distinct and novel weave to embellish his

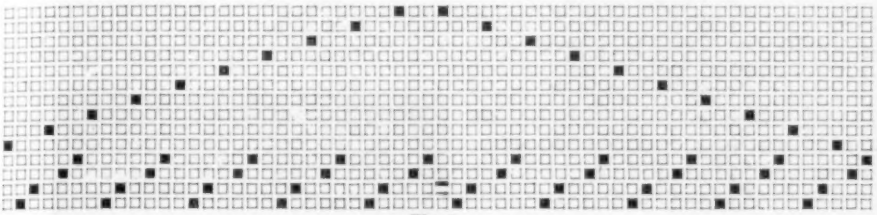


Fig. 5.

work. It is always safe to assume that any weave giving the touch of the well-known five-end satin will be a likely seller, providing there is a sufficient amount of novelty in it to give a distinct and pleasing feature.

Figure 2 is a design for a ground-

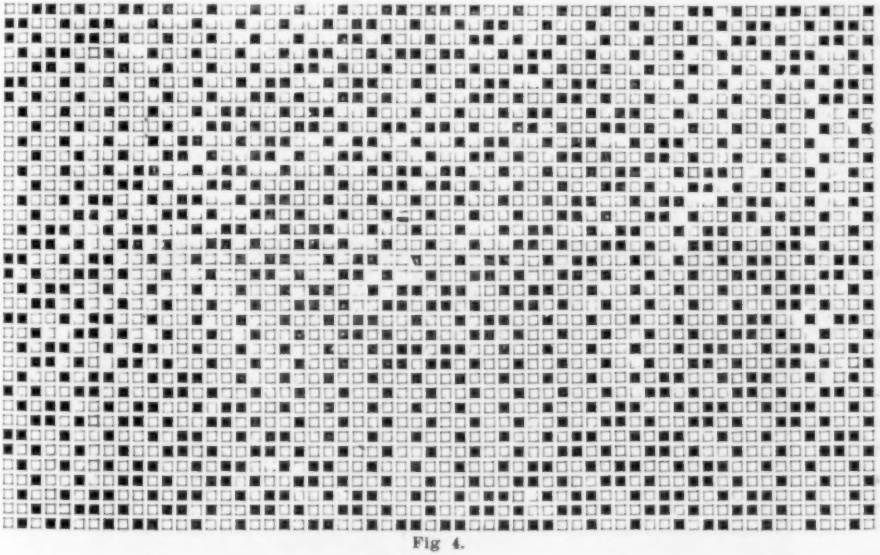


Fig 4.

work which will give a smart result and also the necessary touch which is so great a factor in the success of any fabric. Figures introduced on this weave must not be too crowded but just sufficiently bold to enable the effect of both figure and ground to be seen. The general effect will be much improved if the groundwork be shad-

ed to a solid warp weave at the edges of the figure.

A sketch for a cloth which is very effective is given at Fig. 3. The fine dotted portions are intended to be worked up in a 3x3 mock leno which will be found to produce a handsome result. The dots or floats of weft which surround the figure is a very suitable groundwork, as, owing to the simplicity of the figure, a more elaborate one would tend to drown the pronounced effect.

Neat and simple designs show off the openwork to the best advantage and should be so modelled as to allow a free distribution of this weave inside the figure. The sketch as it appears is considerably reduced on account of limited space, but it is intended to be complete on 390 ends with picks according to requirements. It should be reeded three in a dent in

a 64 reed, and so arranged that the floating ends of the openwork (which weave has previously appeared in the columns of this magazine), are in the centre, as unless this is done a good

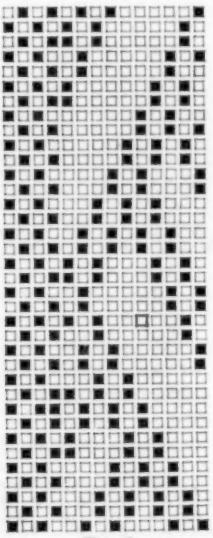


FIG. 6

open effect cannot be obtained. The ground weave of the whole may be plain or a five-end satin, as desired; the total number of ends being adapted to either, whilst it allows of the whole being reeded three in a dent without a remainder, which would not be the case if 400 ends to the repeat were used.

A scheme of weaving employed in the manufacture of quilts, etc., and which may be easily recognized by the embossed nature of the figure, has been used of late for many classes of fabrics, and is likely to come still more to the front. In many cases two separate warps and wefts are used, the backing ends and picks being made of a low quality of yarn, whilst the face is of a good grade. A cheaper and very effective cloth may be made however without weaving with any back-

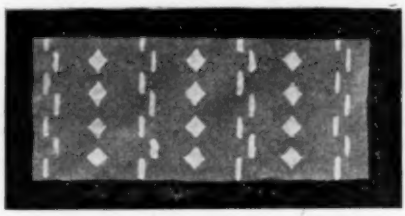


FIG 7.

ing pick; the backing ends, which must be woven with a very high tension, simply floating underneath the cloth when not lifted to form the figure. The designs of course must be so arranged that the floats are not too long. The face ends and picks being of a much lower tension than the rest of the yarn, every lift of the backing thread to the surface of the cloth will, when dropped again, pull that portion where it is lifted, below the level of the surface of that portion where none of these bindings occur. Some designers only raise the tight thread for one pick, but better results are obtained by raising for two picks.

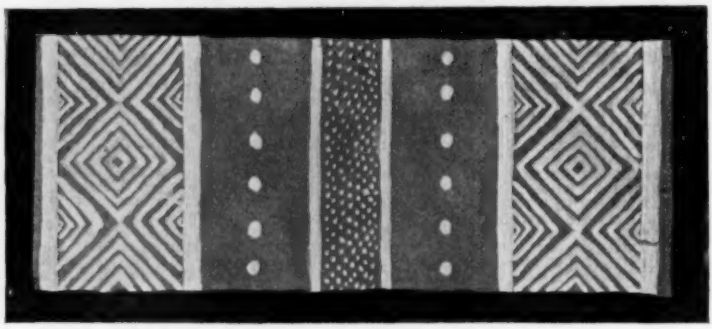


FIG. 8.

A design on point paper, for this class of cloth is given at Fig. 4; the

draft and lifting plans being shown at Figs. 5 and 6. It should be made with 96 threads per inch and reeded three in a dent in a 64 reed; the tight ends being in the centre. The design may be woven in the gray, for bleaching or piece-dyeing, or, if a colored effect is desired, variety may be got by having the tight threads of alternate shades of color contrasting agreeably with the face shade. The plan of weaving being simple, it readily adapts itself to producing effects on a limited number of shafts.

A suggestion for a corded stripe for a shaft loom is given at Fig. 7. The cords are intended to float on the face of the cloth at intervals; and where not up for figuring, to weave plain. The spots may be larger or smaller if desired, but the ones occupying seven ends and picks respectively will yield the best results.

Another suggestion which will give a good result is shown at Fig. 8. It should be woven with soft spun weft of 26's to 30's with about 70 ends per inch and picks in proportion. The zigzag lines should be composed of weft floats of not less than five ends. The fine dotted portion may be composed of crepe or some rough weave, each stripe to be edged with crammed ends of a warp satin weave. The line of spots is added to enhance the effect which, if worked out on the lines given, will prove a very creditable fabric.

NOVELTY.

City and Guilds of London Institute.

ANSWERS TO THE QUESTIONS SET AT THE EXAMINATION IN COTTON SPINNING, MAY 3, 1898.

ROBERT CUNLEFFE.

Question: What is carding? Why is it necessary? What effect has it on the cotton? What defects (if any) arise in the cotton during the process?

Answer: Carding is a part, the last and most important part, of the cleaning process, where the combing machine is not used. Carding also is the straightening out of the entangled mass of fibres. It is necessary because there are still left in the cotton, impurities which the previous machines were unable to take out, such as short, weak, immature fibres, broken seed, neps, etc., which if left in the cotton would have a very injurious effect upon the yarn. It is necessary, because the fibres are crossed in all directions, and matted. Hard lumps of cotton are found in the lap, and it is necessary to lessen these matted lumps of cotton and comb out the fibres and place them in something like parallel order. The effect on the cotton is to disentangle the matted fibres, to clear it from impurities of the kind referred to above, and to form the cotton into a sliver preparatory to being placed under the draw frame rollers. The question asks what defects arise. We are aware that often defects arise here, but they are generally the result of either bad management, bad wire on the card or bad setting. The defects are an increase of nep, instead of clearing them away and weakening of the fibre. This is the result of over carding and bad setting. Sometimes stuffs are formed and pass on with the web.

Question: Describe briefly the construction of a roller and clearer carding machine, tracing the course of the cotton through it.

Answer: The lap of cotton is placed at the back of the card resting on the top of a 6-inch wood roller. The end of the lap rests upon a dish feed plate, and passes between the nose of that plate and the feed roller. The place of cotton is held by the feed roller running at about ¾ foot of surface per minute. This brings the cotton in contact with the teeth of the lickerin, bent forward in the direction of its motion and running at about 800 feet per minute. The points of the teeth strike down into the fleece held by the feed roller and comb out the fibres. They are carried round on the underside of the takerin to the main cylinder, passing on their way

over dirt-knives placed at an angle under the lickerin. These help to clean the cotton from any remaining impurities such as sand, broken seed, leaf, etc. They are then brought in contact with the teeth of the main cylinder, which also are bent in the direction of motion, and run at about 1600 feet per minute. The teeth of the cylinder sweep the cotton from the lickerin and carry it to the dirt roller, the teeth of which face those of the carding cylinder and travel with a very slow speed of only about 16 feet per minute. The carding cylinder then carries the cotton forward to the several pairs of rollers and clearers, and at each pair in succession the fibres undergo a further combing out, or straightening. The motion of the teeth of all these pairs of rollers is in the same direction as that of the adjacent teeth on the card cylinder, but at a much slower speed, and the teeth of the clearers are inclined forward in the direction of motion, while those of the rollers are set in the opposite way, so as to prevent the point of the teeth facing those on the carding cylinder. The cotton, therefore, is carried past the clearer without being caught by its teeth, and it is caught upon the teeth of the roller running at only about 20 feet per minute. All fibres failing to pass the roller are carried round upon its teeth to the clearer which runs at a surface speed of about 400 feet per minute, the teeth of the clearer, therefore, sweep off the cotton from the roller, and are themselves stripped in the same way by the carding cylinder running at the higher speed. After passing the six pairs of rollers and clearers, the fleece is taken off in a continuous sheet from the card cylinder to the doffer, the teeth of which face those of the cylinder, and move in the same direction, but at a much slower speed of only about 65 feet per minute. The cotton is carried round on the underside of the doffer, to a vibratory comb, moving at about 1000 double vibrations per minute. This comb strips the cotton from the teeth of the doffer, and the thin fleece, 40 inches wide, is gathered in by guides to a width of 6 inches and finally into a smooth bell-mouthed, round funnel having a hole only ½ inch diameter, through which the contracted ribbon, or sliver, is drawn by the pair of calender rollers and coiled into a can.

Question: Describe the arrangement of the feed roller, lickerin and mote knives of a carding engine, indicating the way in which the cotton is delivered to the cylinder from the lap.

Answer: This question has been answered to some extent in giving the answer to the previous question. We have only to add that the feed roller is a coarse, fluted iron roller, driven by a side shaft from the doffer being 2¾ to 2⅞ inches diameter running at about ¾ foot surface speed, being weighted at each end by lever weights, so as to firmly hold the cotton under it, it runs in the hollow or curved part of the dish feed. The lickerin is covered with saw tooth wire, which, if properly made and set, does not require either grinding or stripping. The teeth are inclined in the direction of motion and strike the end of lap projecting over the dish feed nose. They do not strike through but only comb out a little from the top and thin it down gradually in the shape of a wedge. Under the lickerin are two mote knives, these are coupled to the lickerin under casing and are adjustable, and are for the purpose of shaking out any of the heavy impurities left in the cotton by the scutching machine. On account of the excessive speed of the cylinder and the number of points of wire on every inch, there are quite as many, if not rather more, points of wire than fibres of cotton, so that there are no thick layers of cotton or large quantities of fibres to be dealt with at any one time by the wire on the carding cylinder.

Question: Describe the disposition of the teeth in card clothing for various purposes. What is meant by foundation, crown and knee?

Answer: Commencing with the lickerin, the teeth are disposed in the di-

rection of its motion, that is, they are bent downwards as the lickerin is running downwards, so as to carry the fibres of cotton on the underside to the cylinder. The teeth of the cylinder are also bent in the same direction of its revolution. So that where the teeth of cylinder and lickerin come together, they are both pointing upwards, and run in the same direction. The teeth of the flats are inclined against those of the cylinder, in order that there shall be a combing out or holding back power in them. Also the teeth of doffer are inclined in the opposite direction to its motion, so that the teeth of the cylinder deposits the fibres of cotton on the points of the wire on doffer. What is meant by foundation, is the material in which the wire is fixed. Sometimes it consists of a number of layers of woolen and cotton cloth, sometimes cloth and layers of India rubber cemented together; the foundation for lickerin is often of leather.

Crown is the back part of the wire where it is bent, there being two points for one crown. Knee is that part where the wire is bent so as to form an angle spoken of as the bend.

Slasher Cylinder Bearings.

Paper read by Frederick A. Flather, Lowell, Mass., before the New England Cotton Manufacturers' Association.

You are all familiar with the truck bearings that are usually employed for supporting slasher cylinders, and therefore, will be interested in the Lowell Machine Shop's new roller bearing for this purpose which Mr. Parker, agent of the Pacific Mills, mentioned at our last meeting. Mr. Parker at that time mentioned some of the points of excellence contained in the Lowell Machine Shop's new slasher.

Mr. Parker had bearings of this type furnished upon a slasher which the Lowell Machine Shop made for the Pacific Mills and they have now been running for some time with good satisfaction. The cuts marked Fig. 2 and Fig. 4 show partly in section, an end elevation, a plan and side elevation, respectively.

The former general shape and dimensions were retained when designing the roller bearing for purposes of interchangeability, but changes in the details were made for the purpose of obtaining hardened rubbing surfaces, which are essential for the permanency of roller bearings. For the journals such hardened surfaces were obtained by covering them with hardened steel sleeves, made of .40 per cent. carbon steel tubing tempered in oil, ground perfectly smooth, straight, true and to the proper diameter, upon their own journals.

Under the old form of construction the stuffing boxes were integral with the journal. In order to put the steel sleeve upon the journal the stuffing boxes had to be removable. This was accomplished by threading them on to the journals by screw-threads cut right-hand for one end of the cylinders and left hand for the other end, so that the friction between the stuffing boxes and elbows when the cylinders were revolving would not tend to unscrew them. The 20 steel rollers 21/32 inch diameter and 4 1/16 inches long which surround and some of which support the journal are hardened and ground with the same care as the sleeves. Their ends fit loosely in pockets bored into bronze rings. Four double-ended studs lying parallel to and among the rollers are riveted into the rings and complete the cage. Their shoulders hold the bronze rings just far enough apart to allow the rollers a little end play and maintain an axial alignment of the rollers and journal. The bronze cage-rings are made smaller in their outside diameter than the bore of the bearing, and larger in their inside diameter than the diameter of the journal, to prevent their rubbing hard against either the bearings or the journals.

The bearings in which the steel rollers run have and need no cap bearings but they are covered for purposes of cleanliness. They are lined with

hardened steel made of tubing split longitudinally and these linings after being fastened into place by four cap screws tapped in from the under side are carefully ground to dimension.

To provide for lubrication, flanges at each end of the bearings project upwards from the main bearing castings until only a clearance is left between them and the collars on each end of the journals. These flanges clear the steel linings endways about one-half inch and dam the ends of the oil reservoirs. The height of these flanges is such that the level of the oil in the reservoirs can be sufficiently high to submerge the lower half of each roller, as it reaches the lowest place in its path of rotation. There is a channel for oil in the main castings, just beneath the steel linings, connecting the oil spaces in the ends of each bearing. Taps in the outer ends of the main-bearing castings provide convenient places for draining and cleaning out the reservoirs.

The old style truck bearings had trucks which were shorter than the journals. They have always cut into the journals and have been made in various ways; sometimes with one truck about eight inches diameter, directly below the journal, with a horn on each side of the journal, projecting upwards from the main casting to take the side thrust, but uncovered and exposed to dust and dirt at the end nearest the cylinder, sometimes with side trucks in place of the horns, and best of all, until the present improvement was made, two trucks with the journal resting upon both wholly covered for purposes of cleanliness. The difficulty with all such bearings is that sooner or later the trucks fail to revolve and the journals become cut.

FIG 1

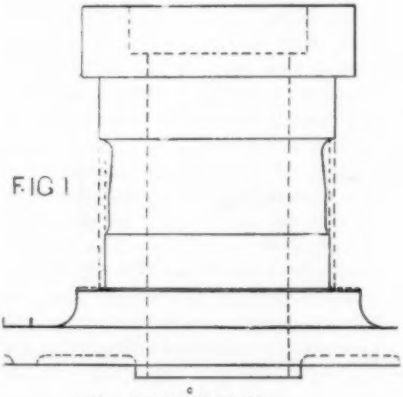
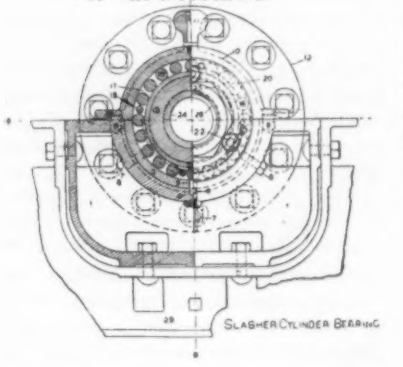


FIG 2 SECTIONAL END ELEVATION



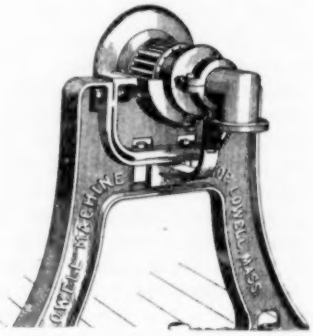
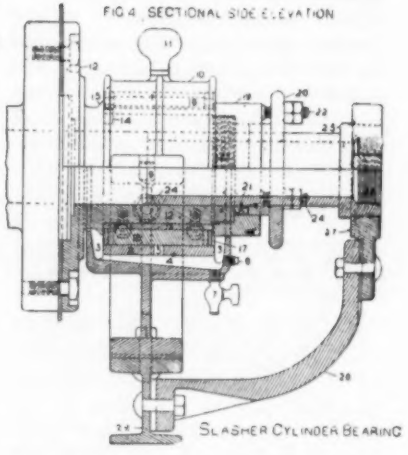


FIG 4 SECTIONAL SIDE ELEVATION



When this occurs the cylinders start hard and require more power, and if the warp is tender or contains only a small number of ends, considerable piecing has to be done. If the bearings are cut on one side of the cylinder only, thereby lowering the worn end a little, the warp strains toward one side, and to avoid piecing the operative starts the slasher carefully and slowly, thus wasting his time and lessening the production.

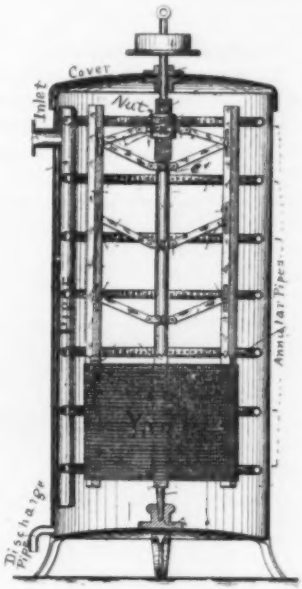
Journals have frequently been cut to a depth of one-eighth inch and if the piping is rigid, the interior surface of the journal drops down upon the elbow and creates excessive friction. The stuffing-box, when the journal lowers itself by cutting, becomes eccentric to the elbow, and the packing which revolves with the journal is soon cut enough to allow steam to escape on the under side. Fig. 1 shows the journal of a truck-bearing after it has become worn, the dotted lines showing the original form.

A careful test was made to find out how much more drag was required to start a cylinder with truck bearings than with roller bearings. Under the best conditions possible the truck bearing required over five pounds to start the cylinder, and, as it is found in most mills that one, two, three or four trucks refuse to revolve, tests were made to show the additional drag that their stoppage created. Under the worst condition more than 19 pounds were required to start the cylinder.

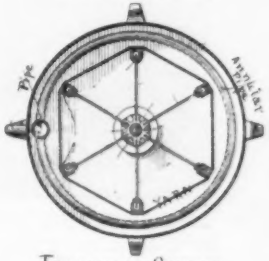
Apparatus for Mercerizing.

The subject of mercerizing cotton yarns and goods seems far from being exhausted, and the time and ingenuity of inventors are now actively employed in putting before manufacturers devices that will accomplish the purpose of utilizing Mercer's discovery. An apparatus invented by a Swiss has just appeared, which we illustrate herewith. The drawing will be self-explanatory to those familiar with the mercerizing of yarn.

As will be noticed, the hanks of yarn are arranged on an adjustable reel which may be axially rotated in a vessel or receptacle, annular pipes being arranged on the walls of the vessel, which pipes are provided with small openings toward the centre of the vessel, so that the mercerizing



VERTICAL SECTION



TRANSVERSE SECTION

liquid may be ejected or sprinkled onto the yarn.

After placing the hanks of yarn on the reel bars, the nut, as noted in the illustration is screwed down, causing the reel to spread out till the necessary tension is obtained. We think it does not need any further explanation, more than what the illustration will give.

WOOLEN DEPARTMENT.

Science and Practice of the Construction of Woven Textures.

FRED BRADBURY.

(Continued from September.)

In further proof of the reasonableness and correctness of the conclusions arrived at in previous articles, it might be added that in a series of experiments of actual cloth structure, the evidence all tended to make manifest that the construction and cover of the cloth (as already partially inferred) were brought into better focus and more thoroughly realized as the warp threads deviated from their original straight line, and produced an angle of increasing magnitude, but of limited dimensions. In a given example the warp remained straight while the weft produced all the bending. In a second experiment the warp line became slightly undulated whilst in a third the warp threads produced greater deviations. The angle producing the most satisfactory results was one which approached nearest that illustrated by the photo-micrograph of warp extracted from No. 1 cloth, and shown at Fig. 29.

FIG. 29 AND 29A.

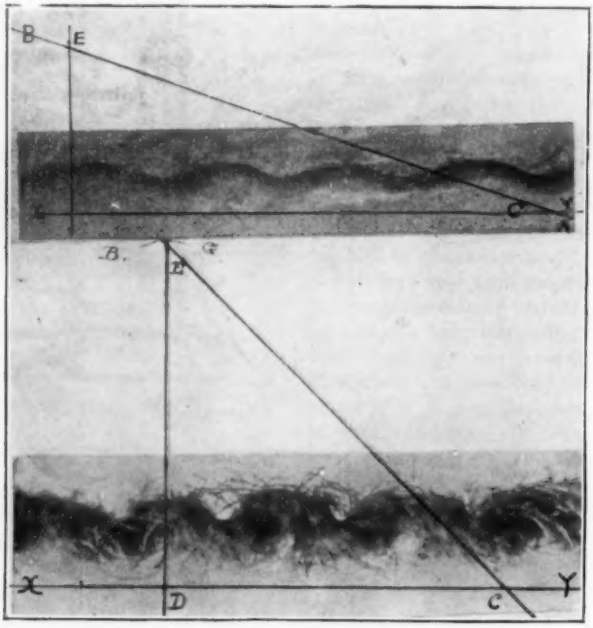


FIG. 30 AND 30A.

For the purposes of instruction and illustration it will be found advantageous to determine the size of the angle which this thread of warp produces, and, as well as is possible that of the weft. The size of any angle may be obtained, first, by finding the numerical value of the angle and second by measuring with the protractor the angle thus produced. To obtain

the size of the angle as above by each method is comparatively easy when given the following data and method of construction.

Given.—A second photo-micrograph of the above warp thread as shown at Fig. 29 "A." Construction.—Draw an unlimited horizontal straight line x y as parallel as is possible with the direction of the reproduced yarn shown, a second straight line "A. B" through or parallel with an imaginary straight line drawn through the centre of the curved thread in its lowest and highest position for one intersection of warp and weft and typical of the inclined direction of the former, and cutting "xy" in the point "C," but unlimited towards "A" or "B." From the point "C" measure three inches, or any other convenient unit, along its length in the direction of "x;" indicate this point by the letter "D;" from the point "D" draw a straight line at right angles to "DC" or "xy" cutting "AB" in the point "E."

Measurement.—Obtain the distance "CE" in the same unit as before ("DC") then the angle "DCE" represents the size of the angle produced by the warp. Further, by comparing the length of the base "DC" with that of the hypotenuse "CE" we obtain, not only a ratio of the base to the hypotenuse, but also a numerical value of the cosine of the angle "DCE" (or inversely the value of secant of the angle "DCE").

Proof.—In the triangle "DCE" let "x" represent the numerical value of angle "DCE." "ED" equals perpendicular (being the side opposite angle "x" under consideration), "DC" equals the base, "CE" equals the hypotenuse, then "DC" ÷ "CE" = Base ÷ Hypotenuse = cosine of angle "x." Base "DC" = 3 inches by measurement. Hypotenuse "CE" = 3¼ inches, by measurement. Cosine of angle "x" = (3 ÷ 3¼) = (12 ÷ 13) = 0.923 numerically.

In the application of trigonometrical science to any practice, a book of mathematical tables is used, from which, as from a dictionary, the numerical value of the ratio of any given angle can be found, conversely, from the ratio of a given angle the size can be obtained. Hence, when the numerical value of the cosine of an angle is 0.923 the size of the angle is given as 22½°.

Further, if the approved point in a protractor be centred upon the point "C," with the base line of the protractor coincident with that of the horizontal line "xy," the straight line "CE" or "CB" will be observed between the circular divisions 22° and 23°. To measure the angle of curvature of the weft is not quite as easy a matter as that of the warp, chiefly on account of the spiral twist which the weft has received in its structural relation to the woven fabric. Hence, by no reasonable means could I make the weft of No. 1 cloth or in a lesser sense Nos. 2 and 3 textures lie in such a position for photo-micrography that an ideal line drawn through or parallel with the central axis of the full length of the thread would remain in a parallel relation with the plane of the background against which the yarn was placed for microscopic examination and for subsequent photo-micrography. The thread presented more the appearance and shape of a corkscrew, which will be partially evident to the careful observer of the photo-micrographs shown at Figs. 30 and 30A.

We have, however, demonstrated upon a previous occasion that when both sets of threads are bent out of the straight line and when the woven texture contains as many threads as their angles of curvature and their diameters admit, assuming one set of threads produces an angle of 22½° the opposite set will produce an angle of 45° or vice versa (see Fig. 9, December, '98). The angles produced by the intersection of the weft threads as revealed by the photo-micrographs, Figs. 29 and 30 are perhaps represented better diagramatically by the illustration Fig. 9, than by any other diagram conceived or demonstrated in these articles, assuming we read Fig. 9 to represent a cross section through the weft instead of through the warp as originally intended.

Reverting to the deductions obtained

from a study of Figs. 8 to 11a, inclusive, it will be observed that when one set of threads remains straight in the woven texture, while the other set produces all the bending, as at Fig. 11, a cloth can be made which contains relatively a greater number of warp and weft threads per square inch and consequently a greater weight of fabric than could be obtained under any other natural or ordinary conditions. However, no practical manufacturer, expert or writer on textile subjects will assert that it is impossible to produce a woven texture which does not contain relatively more threads and weight per square inch than is obtained under ordinary conditions for as soon as compression and spiral twist become factors, the construction of the cloth is immediately modified so that it then becomes possible to increase or decrease the relative number of threads and weight as above. If an increase of threads of warp or weft does not result in a natural or in any decrease in the opposite set of threads it will of necessity produce angles which are not obtainable under ordinary and usual conditions. Thus, consider for example Figs. 11 and 11a, where the warp threads are straight and the weft produces the maximum amount of bending. Disturb, for the purpose of illustration, the perfect straightness of the warp until it produces an angle of 22½°, as at Fig. 9, or increase the angles of both sets of threads upon the original Figs. 11 and 11a until they produce angles as at Fig. 10. Note in each case, especially the latter, we have a result which can only be obtained when the yarn is simultaneously subjected to compression and a spiral twist.

Let us now proceed to determine as approximately as is possible, compatible with the difficulties involved, the angle produced by the weft of cloth No. 1.

Given.—A second photo-micrograph of the weft yarn of above cloth as shown at Fig. 30A.

Construction.—Draw a horizontal straight line "xy" of unlimited dimensions, as parallel as is possible with the direction of the illustration of the yarn shown, and a straight line "AB" parallel with an imaginary or drawn line passing through the centre of the thread in its lowest and highest positions of any two successive intersections. The line "AB" represents the average inclination of the weft yarn and is unlimited in the direction "A" and "B" and lettered "C" at the point where it cuts "xy." From the point "C" measure two inches or any other convenient unit along its length in the direction "x." Indicate this point by the letter "D"; from the point "D" draw a straight line "DG" at right angles to "DC" unlimited towards "G" but cutting "AB" in the point "E."

Measurement:—Obtain the distance "CE" in the same units as above. Then the angle "DCE" represents the size of the average inclination of the weft. By the comparison of the length of the base "DC" with that of the hypotenuse "CE," the ratio of the base to the hypotenuse is obtained and also the numerical value of the cosine of the angle "DCE."

Proof.—In the triangle "DCE" let "x" represent the numerical value of the angle "DCE;" "ED" equals the perpendicular; "DC" equals the base; and "CE" equals the hypotenuse. Then "DC" ÷ "CE" = Base ÷ Hypotenuse = cosine of angle "x" also base = 2 inches by measurement. Hypotenuse = 2 13/16 inches by measurement. Therefore, cosine of angle "x" = (2 ÷ 2 13/16) = (32 ÷ 45) = 0.711 numerically.

When the numerical value of the cosine is 0.711 the size of the angle is always equal to 45° 19′ or practically 45°.

By the application of the protractor similar results will be found to coincide with the foregoing. To obtain the proper amount of increase in the angle of curvature, requires essentially in principle, as will already be understood, an increase in the number of the same set of threads.

At this juncture I might with advantage recite an incident which occurred some time ago. A manufacturer submitted for my consideration two woven fabrics of similar material, but

one of them was much superior and preferable to its competitor. The manufacturer was anxious to know the cause of this difference. Upon observation it was apparent that one set of threads was very much more curved in appearance than the corresponding set of threads in the contemporary cloth. His attention being drawn to the fact, he naturally inquired how to proceed to obtain the necessary increase of angle. My reply being given, based upon the principles stated above, the instructions were followed, an increase in the angle was obtained much nearer the ideal together with an admitted improved result.

By a curious coincidence it transpires that the amount of increase in the number of threads which a fabric may contain when both sets of threads are bent out of the straight line is in the direct ratio of the hypotenuse to the base or hypotenuse ÷ base, or in the ratio of the numerical value of the secant of the angle, e. g.: assuming our initiative to be a straight line of thread, the distance apart of the straight threads being represented by one diameter of warp plus one diameter of weft, then any deviation from the straight line of thread will invariably require an increase in the same set of threads in the direct ratio of hypotenuse to the base.

This furnishes us with a ready means of not only proving the results obtained by former methods in the construction of woven fabrics in which both sets of threads were bent out of the straight line, but of also determining the most suitable set for other fabrics where the conditions of manufacture appear, upon the surface, more complex.

In the application of the foregoing assertion the ratio of the hypotenuse to the base may always be readily determined when the angle of curvature is known and given the following values of cosine of the angle under consideration to third nearest decimal:—

Cosine of angle 15° = 0.966 numerically.

Cosine of angle 22½° = 0.923 numerically.

Cosine of angle 30° = 0.866 numerically.

Cosine of angle 45° = 0.707 numerically.

Cosine of angle 60° = 0.5 numerically.

Then since the cosine of any angle always equals base ÷ hypotenuse, the value of the hypotenuse for each of the given angles may be found as follows and subsequently employed as a simple formula.

In cosine of angle 15°=Base÷Hypotenuse=0.965.

Let base equal unity: Then 1÷Hypotenuse=0.965=$\frac{965}{1000}$. By multiplying across we obtain 965 Hypotenuses = 1000 Bases. Hypotenuse = $\frac{1000}{965}$ = 1.036. When base=1.

In cosine of angle 22½°=Base÷Hypotenuse=0.923.

Let base equal unity: Then 1÷Hypotenuse = 0.923 = $\frac{923}{1000}$ = (1÷1.08). Hypotenuse=1.08 When base=1.

In cosine of angle 30°=Base÷Hypotenuse=0.866.

Let base equal unity: Then 1÷Hypotenuse = 0.866 = $\frac{866}{1000}$=(1÷1.154). Hypotenuse=1.154. When base=1.

In cosine of angle 45°=Base÷Hypotenuse=0.707.

Let base equal unity: Then 1÷Hypotenuse = 0.707 = $\frac{707}{1000}$=(1÷1.414). Hypotenuse=1.414. When base=1.

In cosine of angle 60°=Base÷Hypotenuse=0.5.

Let base equal unity: Then 1÷Hypotenuse=0.5=$\frac{5}{10}$=$\frac{1}{2}$. Hypotenuse=2. When base=1.

The foregoing reduced to simple formula together with its application may be stated as follows:

Formula IX applies to cloths in which both sets of threads are bent out of the straight line. Thus, one diameter of warp plus one diameter of weft multiplied by the numerical value of the cosine of any given angle or (one diameter of warp + one diameter of weft) ÷ (Relative length of the hypotenuse to the base).

The result of which represents the distance apart of the centres of any two consecutive threads at the point of intersection for any given angle.

N. B. When the threads and intersections in one repeat of the weave

are equal, as in cloths Nos. 1, 2, 3, the denominator of the distance apart obtained in inches indicates the number of threads per inch finished.

The proof and usefulness of this formula is evident, if we subject it to the following tests. In Fig. 8 (pages 65 and 66, Nov. '97), the warp and weft formed equal angles of 30° and the diameter of each yarn 1/60 of an inch. The number of threads per inch were found to equal 34.6. By the above formula the same results are obtained. [(Warp 1/60) + (weft 1/60)] ÷ 1.154 = 1/30 × 1000/1154 = 1/34.6.

Similarly for Figs. 9 and 10 warp and weft as before, but the angles produced by the warp equal 45° and 60° respectively, also the number of threads of each per inch were found to equal 42.4 and 60° respectively.

By formula IX we obtain identical results. Thus, angle 45° (Fig. 9 warp) [(warp 1/60) + (weft 1/60)] ÷ 1.08 = 1/30 × 100/108 = 1/42.4 inches.

Angle 60° (Fig. 10 warp). [(warp 1/60) + (weft 1/60)] ÷ 2 = 1/30 × ½ = 1/60 inches, or 42.4 and 60 threads of warp per inch respectively.

To have obtained the correct number of threads of weft per inch in each cloth represented by the two last named figures and upon the original basis of construction and calculation would not have been possible, because to obtain these angles the yarn must be subjected to compression or a spiral twist, or both of these factors combined as is typifed in cloths Nos. 1, 2, and 3.

These cannot very well be represented upon a plane surface for the purpose of calculation. However as the truth of formula IX has been demonstrated as above, such calculations may be readily determined, e. g., in Fig. 9, where the angle produced by the weft is 22½° the number of threads of weft per inch is obtained thus:

[(warp $\frac{1}{60}$)+(weft $\frac{1}{60}$)]÷1.08=$\frac{1}{30}$×$\frac{100}{108}$=(1÷32.4).

The weft in Fig. 10—angle=15°. ($\frac{1}{60}$+$\frac{1}{60}$) ÷ 1.036=$\frac{1}{30}$×$\frac{1000}{1038}$=$\frac{1}{31}$, or 32.4 and 31 threads of weft per inch respectively.

With the knowledge comprised in the above theory, the actual angle produced by the warp and the construction of the ideal face cloth No. 1, we have sufficient data to obtain the correct amount of compression of the weft, previously estimated, the confirmation of the size of the angle produced by the weft, and any other necessary particulars of construction.

Given—The angle produced by the warp=22½° demonstrated. The diameter of the warp=$\frac{1}{111}$ of an inch. The number of threads per inch in the cloth =38. The numerical value of Hyp.÷ base=secant 22½°=1.082. Hence base =1 when Hyp.=1.082.

Let 1÷x=the diameter of the weft at right angles to the warp. Then by formula IX we obtain, ($\frac{1}{111}$+1÷x)÷ 1.082 (hyp.)=$\frac{1}{38}$=distance apart in inches of the centre of two consecutive threads of warp at the point of intersection = (111+x) ÷ (111x×1.082)= $\frac{1}{38}$. Multiply across to clear away fractions: 38 (111+x) =111x × 1.082 = 120.102x. 4218=120.102x—38x=82.-102x. x = 4218÷82.102 = $\frac{1}{51}$ nearly, hence 1÷x—$\frac{1}{51}$ of an inch nearly. Consequently the diameter of the weft in the direction at right angles to the warp or at the point of intersection=$\frac{1}{51}$ of an inch.

By formula VI we obtain the increase in the diameter of the weft in the direction of the length of the piece thus: (1/41 × 1/41) ÷ 1/51 = 51 ÷ (41 × 41) = 51/1681 = 1/33 of an inch.

To obtain in a simple fraction the amount of compression which will be found useful we proceed simply as follows; the truth and facts which the figures represent will be at once apparent.

$\frac{1}{33}$—$\frac{1}{41}$=(41—33)÷ (41×33)=$\frac{8}{1353}$= (1÷169.1),

i. e., the weft has been compressed so that the original diameter has increased 1/169 of an inch which, simplified, = 1/169 ÷ 1/41 = 41/169 = ¼, or the amount of increase due to compression is equal to ¼ the original diameter of the weft.

With the particulars as determined heretofore we may verify the angle produced by the weft as measured, or

assuming the actual measurement to be correct we may obtain the number of picks of weft which would be found to be almost identical with those contained in the actual fabric. We shall, however, confine ourselves to the former, thus: Let "y" = the secant of angle "x."

$(\frac{1}{111}+\frac{1}{33})\div y=\frac{1}{36}$. $=(111+33)\div y$ $(111\times 33)=\frac{1}{36}$. Multiply across: $y111\times 33=144\times 36$. $y=(144\times 36)\div(111\times 33)=\frac{5760}{3996}=1.415$. Secant of angle produced by the weft$=1.415$.

From the tables we have given, the size of the angle, the numerical value of whose secant is 1.415, to be equal to 45° 2′, or practically the same as measured.

Hence we have established a theory which will enable us to determine as correctly as is possible the construction of a cloth, including compression, when both sets of threads are bent out of the straight line.

The reader may select, if preferred, the method of determining the construction as explained in the September issue providing he also makes allowance for the reservation accompanying the remarks; in some respects it will be found more simple than the foregoing which ignores no insignificant details. Yet, I do not propose to point out every detail with such circumstantial exactness as will leave no room for doubt, error or modification.

The manufacturer of woven products has such a numerous and varying quantity of modifying factors to include in his considerations that if I record the results of my experience and observation coupled with an expression of opinion including the reason for such and such results I claim to have accomplished my self-imposed task. I do not, however, think it necessary to proceed further upon these lines of thought in this particular section of the work, though I am satisfied that there is an unexplored region, an extensive field of material and of thought awaiting solution, dissection and arrangement by the mind sufficiently ingenious and disposed, and he who performs this work will have the satisfaction that at least, he has not been the dispenser of other people's prescriptions.

(To be continued.)

Ingenuity in Modern Textiles.

ARTICLE II.

CHARLES E. WILES.

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The method of construction adopted in Design 1, and also in the last plan of the preceding article occurs with marked frequency in vestings of what may be termed a medium grade. The face of these fabrics being as it were, free, the use of either simple crossings or more elaborate figuring is permissible, and spottings of silk may be also introduced where desired. Here, two face threads are working in conjunction with each binding thread of cotton and two face picks with a single backing pick.

In making a plan of this kind matters are facilitated by indicating the positions of these threads and picks on the design paper previous to filling in any of the actual weave element. The crossing for the face of this texture is shown in Figure "A," and none but the face threads and picks are requisitioned here. The binding cotton threads and the backing picks interlace in plain order, and the stitching together is effected by bringing every cotton thread in its turn over a face pick in such a position as will be least likely to become visible. These tieing places are indicated by black dots with white centres; the ordinary dots show the face weave, the solid squares the plain backing, and the crosses the depression of the binding threads under the face picks.

WEAVING PARTICULARS FOR DESIGN NO. 1.

Warp.

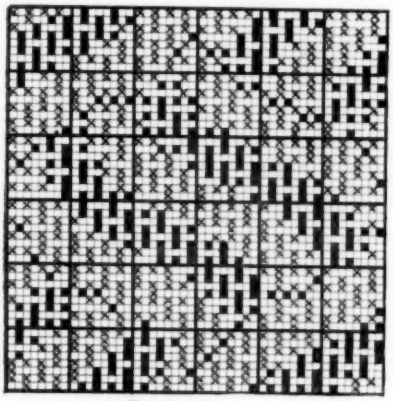
1 thread 2/48s, worsted—Drab shade.
1 thread 2/40s, cotton—Drab shade.
1 thread 2/48s, worsted—Drab shade.
30s reed 3s.

Weft.

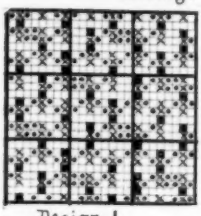
1 pick 2/48s, worsted—Drab shade.

1 pick equal to 2/28s, worsted—Drab shade.
(Cotton is often employed for the above.)
1 pick 2/48s, worsted—Drab shade.
90 threads and picks per inch.

The foregoing particulars do not include any extra spotting picks. Such spottings may, however, be introduced acording to the dictates of fancy, the principles underlying weft



Design 2.



Design 1

A

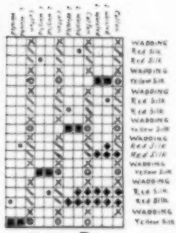


FIGURE B.

spotting being enunciated at some length in the last article.

Fancy woven checks, based on similar principles of construction are numerous, the checkings being entirely due to the weaves employed and the yarns generally of a solid shade throughout. In the middle of each check a very small but ornamental spot is introduced, and often by inserting spotting picks of differently colored silks a further degree of interest is imparted to these productions.

There is also a fair assortment of vestings appertaining to the honeycomb style, and some particulars relating to a noticeable one in this class are here appended. The threads and picks which float largely on the surface and surround the cell-like portions of the texture are of a fairly stout worsted yarn, whilst the other yarns for the groundwork are thinner and of cotton. An additional depth is thus given to the cells which may possibly be somewhat of a novelty, and this in combination with a regular series of silk spots in the centres of the same, compels one to ascribe to the fabric a certain degree of smartness, but the novel effect unfortunately proceeds from a cause which must preclude such a production ever attaining any high claims on popularity. Effects after the fashion of those characterized by honeycomb weaves when applied to materials for wear as apparel may be ornamental, but unless the fabric is a washable one it can never be serviceable. It is surprising what an amount of dust will be collected by wearing a vesting of this class for a single day. In designing, as in everything else, due regard must be given to that adamantine law which relates to the fitness of things, if the best possible results are to be obtained.

In the same category may be mentioned another system of production and one of which there is a goodly representation. This is the "loop pile" effect, a term employed to designate those vestings whose principal feature is seen in the soft wooly surface they possess, the direct result of certain threads in the warp being woven over wires. Even if one cannot well get rid of the idea of their unhygenic aptitude for accumulating dust, there are undoubtedly some beautiful textures of this class to be seen. What may be termed the pile warp is of fleecy wool which possesses the quality of filling out well when finished, and in the majority of cases there are one or two cotton threads between each pile thread giving strength to the texture. The ordinary weft yarn is of cotton, and to

add fulness and soften the handle a woolen backing weft is also inserted. The cotton warp and weft weave plain, the latter being further employed to bind the pile threads down where required. At the same time the cotton warp is utilized for the purpose of attaching the woolen picks which form the back. Many pleasing varieties of colored stripes may be produced by harmonious arrangements of shades in the pile warp, as these are the only threads visible on the surface, and modifications may be effected by such devices as bringing the pile threads only over alternate wires. About twelve wires per inch and forty pile threads are employed in the typical specimens, the counts of the various yarns being as follows:

Pile warp equal to 2/32s, worsted.
Cotton warp, all single, 18s.
Backing weft, 18 skeins wool.
Cotton weft, single, 24s.

Design No. 2 is the plan for a vesting fabric which is drawn upon in the production of these goods. As it is in reality a single-make texture it might have been advantageously included when treating of that special branch, but there are one or two points connected with this style which afford a sufficient reason for its appearance here. It will be noticed that all the odd threads in the design are working together towards the production of one part of the figure, whilst the even threads are making the complement. The face of the finished fabric is therefore a warp effect, and the outlines of the figure are obtained where the odd and even threads change positions to float on the surface. A glance at the intersections made by the weft will show in what manner the necessary firmness is preserved to the utmost, the plan adopted serving to exclude all long and unsatisfactory floats of warp on the back of the texture. Particulars for weaving this design are here given, and if a small silk spot be added in the middle of each alternate repeat a distinctly useful and stylish fabric will result.

Warp.

All 2/48s, worsted, dark green shade.
30s reed 3s.

Weft.

All 2/48s, worsted dark green shade.
90 threads and 80 picks per inch.
The silk used for spotting purposes might be of 60s, 2-fold, doubled, either scarlet or blue.

Leaving the woolens and worsteds, a wide and brilliant assortment of vesting fabrics with silk faces demands recognition. These of course are employed in the main for ladies' wear and in most instances are an improvement in appearance on those just mentioned, but lack the excellent wearing quality. Moreover such goods, on account of the stiffness imparted both by the backing and binding yarns and also by the finishing operations, require the greatest care in making up to be satisfactory—vests of such materials must fit—and fit well, or they will be always unseemly, and ungainliness is here much more conspicuous than is the case with a woolen or worsted texture.

Design 3 has been prepared with a view of affording an idea of the general construction of a large section of these goods, and it produces a very neat effect when suitably woven. Warp ways of the design there are two threads of face or silk yarn to one of binding or cotton. These two face threads might as a matter of fact be drawn through one mail in the harness, but they have, for the sake of clearness, been reckoned as separate in the design. In the direction of the weft the fabric is all cotton, the picks being arranged four and one. These fours are in reality of the nature of wadding picks, whilst the "ones" are of a finer yarn, their chief duty being to stitch down the floating silk warp and thus delineate the figure. Care must always be exercised when preparing such designs for the loom to insure the proper counts of yarns being selected and arranged in such a sett as will tend to their making a rich looking "face" and one which does not expose in an unnecessary

manner the intervening binding threads. The wadding picks are held in their correct positions by the cotton threads and a reference to the plan will show that they are never lifted over any other threads but these; wherever these cotton threads float over the wadding picks they are hidden by the flushes of the silk warp.

The squares marked in solid black indicate where the silk is bound down by the fine cotton picks, and serve to give some idea of the appearance thus produced on the face of the fabric. A pleasing arrangement of spots preserves the pattern from any danger of monotony, but as the ground design is of considerable dimensions no more than an indication of this has been given (see shaded portion of plan.) Each small spot as it appears on the surface consists of two double picks, one at either side of and covering the small cotton pick on which it is marked. Between each repeat of the spot across the piece the silk weft flushes loosely on the back, or it may in some instances be sheared off. This explanation, taken in conjunction with the accompanying weaving particulars should render the construction perfectly simple.

Warp.

1 thread silk*, medium shade lavender.
1 thread 2/100s cotton, medium shade lavender.
1 thread silk, medium shade lavender.

Weft.

(Disregarding extra spotting picks.)
1 pick 2/100s cotton, medium shade lavender.
4 picks 2/50s cotton, medium shade lavender.

Perhaps the most prominent position in silk face materials of this class should be allotted to fabrics of the matelasse type, because among those goods are to be found some of the most perfect examples of the designer's ingenuity and weaver's skill. On account of the restrictions necessarily imposed in a review of this kind, it is impracticable to give more than a general idea of some of these fabrics, because a design to be of any real service for this style of goods would require to be such a size as would render its reproduction for the reader an impossibility, but so far as a clear conception of the principles underlying their construction can be given an effort will be made to do so.

The most important system of threads in these textures is the face warp for the sole reason that these threads are the ones which appear in greatest numbers, forming as they do the chief bulk of the ornament. Where these threads are floating on the surface a rich fulness is imparted by the insertion of wadding picks consisting either of thick yarns or numerous strands of thin ones. Between each wadding pick is one of fine cotton, which may be employed along with the silk warp to shade the figure and which generally interlaces plain with another series of fine cotton threads in the warp system. A soft back is usually woven on the fabric by means of a thick woolen weft which is stitched in twill or sateen order by the cotton warp. The indentations which are so typical a feature of matelasse patterns are formed by bringing a fine cotton pick over the silk face and stitching it down on both sides by means of the cotton warp previously mentioned. The best designs are those which result simply from an ornamental outline, and, in order to obtain richness no more than is absolutely necessary of the ground should be visible, as when the face is all silk any appreciable quantity of cotton appearing thereon will at once detract from its brilliance, rendering it more or less dull and seedy looking. Figures outlined by graceful curves and adaptations of the old fashioned key patterns seem to be in greatest favor. The counts of the various yarns in the fabric just considered may be helpful as affording a fuller idea of its construction, and they are therefore set down here.

*The silk for warp should weigh about 4 drams per hank of 1000 yards, and that for spotting 8 drams, the fabric having approximately 160 threads and 120 picks per inch.

Warp.

Silk yarns for face, 3½ dram doubled.
(Peacock blue.)
Cotton 2/70s black.

Another prominent style of matelasse vesting has a fine mohair or lustre worsted face warp (2/120s), the weft being of silk in two colors ar-

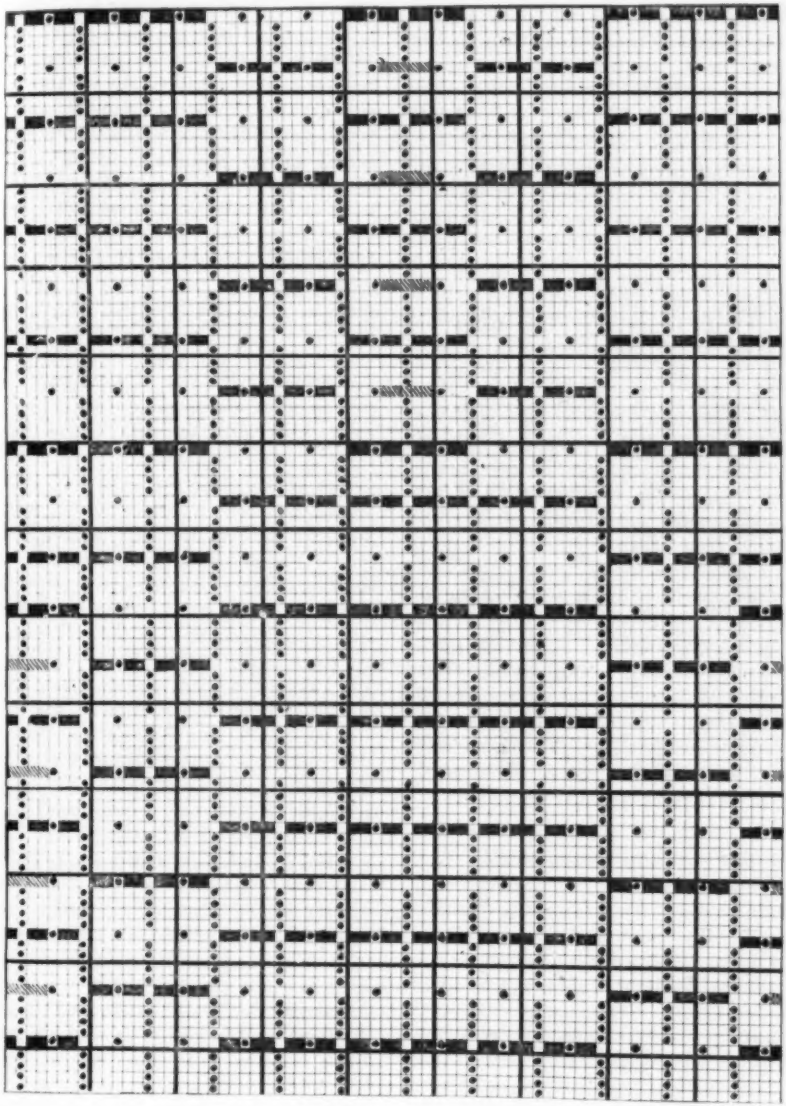


FIG. 3.

Weft.

Cotton 2/70s dark blue.
Wadding yarn equal to 30 skeins wool three-fold.
Backing weft, 20 skeins dark blue.

ranged two and one. The face warp, in combination with those picks which work in pairs, gives a satin effect upon which the characteristic furrows are produced by the other

silk picks. Small figures of a rectangular nature are also produced by flushing the first-mentioned weft on the face. The general principles of construction are embodied in the small plan Fig. B, and in order that the intersections of the various threads and picks may be clearly followed a description of each is added close to the plan itself. It will be seen from this that whilst the red silk weft is weaving in eight stave satin order with the lustre worsted warp, the yellow silk is intersecting in a three and one twill with the cotton. The wadding picks lie loosely between the face and back and are only retained in their correct position by the occasional movement of the yellow silk picks from the back to form the furrows on the face. The solid black squares have been added to the plan to illustrate this alteration of position, and the diamond shaped marks show in what manner another section of the ornamentation is produced—viz.: the solid red figuring. The face warp is therefore never crossed save by the two silk wefts, and the yarn which is responsible for binding the fabric together is in reality the yellow silk. If this latter did not interweave with the worsted warp fairly regularly the cotton threads and wadding picks would be useless by reason of their being nothing to maintain them in position.

PARTICULARS FOR WEAVING.

Warp.

1 thread 2/120s cotton, black.
2 threads 2/120s worsted, black.
40s reed 3s.

Weft.

1 pick, 4½ dram silk, yellow.
1 pick, wadding (equal in size to 10s woolen).
2 picks, 4½ dram silk, deep red.
120 threads and 150 picks per inch.

No reference has yet been made to what may be literally termed pictorial vestings, or such as are embellished in the loom with various devices; horses and horse accessories, dogs, shells, guns, trees, stags and what not, wrought in brightly colored silks. The adoption of these and similar ideas for vesting fabrics is a revival in a considerably modified form of the picturesque productions which were designed to meet the fashionable demands of nearly a century ago. But in fabrics of this type made today the details assume more the character of spottings than of filled up ornament, and modernized taste is studied in the more harmonious colorings and the neatly woven grounds upon which to display them. The warp of these textures is generally of a moderately fine lustre yarn and the ground effect is for obvious reasons produced by weaves with a maximum of warp flushes. The silk for the figures is usually arranged to run pick and pick with a cotton weft and the method of manipulating the silk picks is only an extension of the principle which governs extra weft spotting, which has been previously spoken of. The different colors often observable in each figure are mostly produced by weft silk colors being inserted in sections, say thirty picks of one shade, ten of another, sixty of a third and so on, the design being so arranged as to render any suggestion of this imperceptible. It sometimes occurs, however, that the colors will work one and one, the first pick making a portion of the figure one shade and the next forming a differently colored effect elsewhere in the pattern. The practice of a fair amount of thought becomes requisite for such productions, and unless the subject is undertaken in an ingenious and skilful manner there is constant danger of the resulting texture being unmistakably branded with the mark of vulgarity. It will be hardly necessary to state that ladies are the chief customers for these ornamental productions, and indeed it is well so, for there is often a certain flippancy observable about some of the proffered designs which, were they extensively adopted by men would ill accord with orthodox notions of masculinity.

In view of the numerous varieties of vesting goods which are constantly being encountered here, there, and

everywhere, the impossibility of making useful reference to more than a percentage of them in such a series, will be readily recognized; however, those which have been here considered may be taken as typical specimens of this branch of trade, and the principles which underlie their construction once being known, it becomes a comparatively simple thing to evolve others which shall be of corresponding excellence.

Woolen and Worsted Designs.

Few, other than those engaged in manufacturing have any idea of the amount of ingenuity, skill and care required to be bestowed upon patterns at every change of season. The fickle mistress of fashion favors this or that. Some styles take and have a run but are sure to be soon imitated by competitors who make a living by copying good styles in cheap, low goods. Thus there is a demand for constant thought and new ideas of novelties.

Figure 1 is a suggestion for a fancy worsted dress goods cloth where the warp may be of a low grade of worsted, as the filling will be found to be predominant to the eye in both the ground work and the figure, providing it is worked out in the manner indicated at Fig 2, where a portion of the sketch is developed on design paper. A good result would be obtained if woven with 64 ends per inch of 1/30 worsted of a low grade, and filled with 70 picks per inch 1/30 of a better grade of the same size. The warp colorings should be solid and of a pleasing contrast to the filling, which should also be solid. A few combinations which will give good results, are: Golden brown and dark blue, moss green and dark red, blue gray and black, russet and olive, light blue and coffee brown, the latter shades to be the filling in each case.

There is now always a tendency, more or less, to employ developed weave figures in woolen dress goods. It is only within the last few years that manufacturers have become alive to the vast possibilities which are open to this class of fabrics, to one having a thorough knowledge of woolen yarns in conjunction with the technical structure of the same, on a sound basis, can give the best results.

The bindings of the threads, as any one well versed in designing knows, have a much different appearance to the bindings of a silk fabric, and manufacturers who take their ideas from foreign samples of silks, etc., should bear this in mind. It is only by a

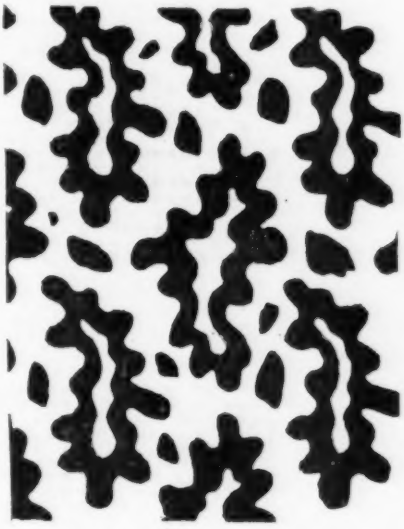


FIG. 1.

wide experience and a thorough study of the different conditions existing between a given fabric and the one which it is desirable to imitate, that successful and cheaper patterns may be made. There is certainly a wide field for the fancy tweed manufacturer in which yarns, colors and weaves are combined to form one harmonious whole; and, as might be expected, good results are obtained in this manner. It often happens that a designer who may be skilled in the manipulation of threads has not a sufficient sense of coloring to give the patterns that snap and clearness which is bound to make a hit and become to a good seller. And this accounts for the failure of many cloths

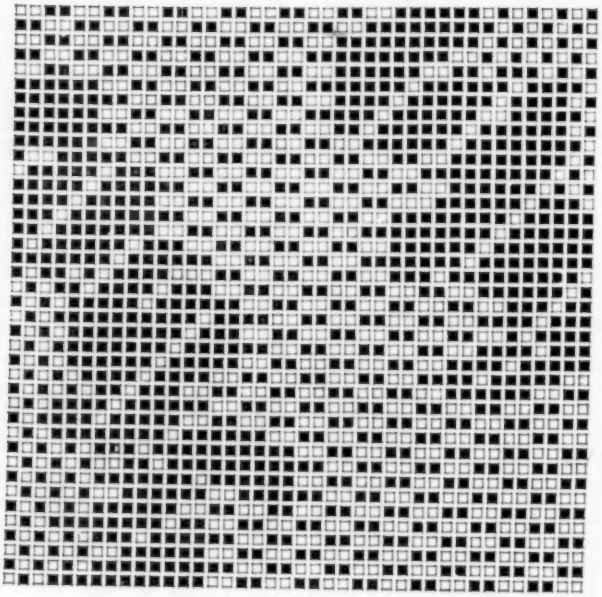


Fig. 2.

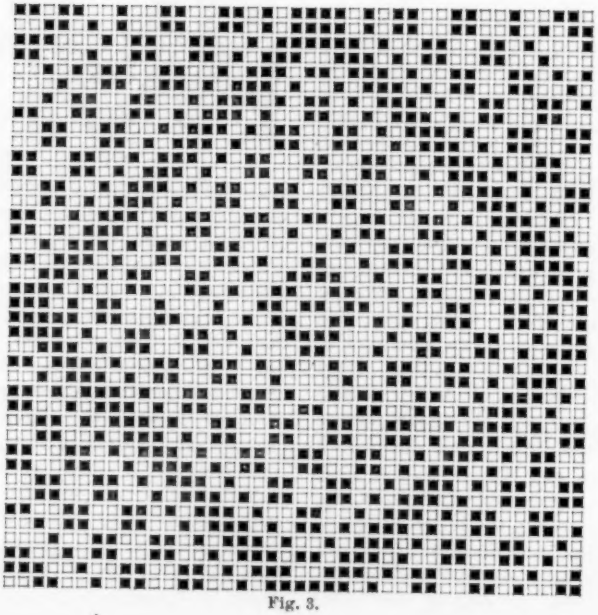


Fig. 3.

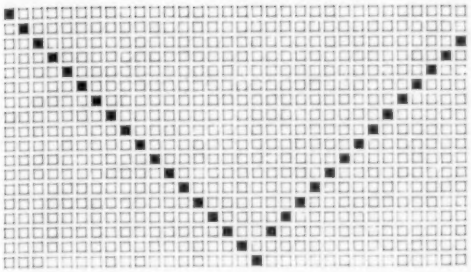


Fig. 4.

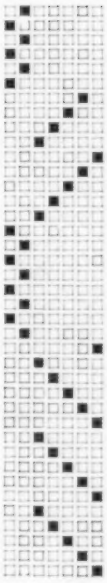


Fig. 8.

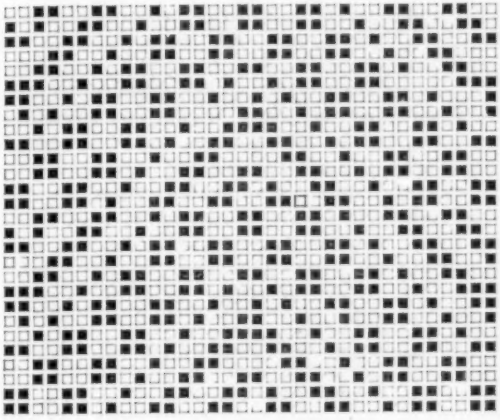


Fig. 5.

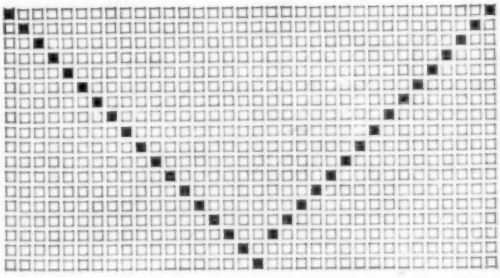


Fig. 6.

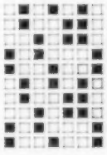


Fig. 9.

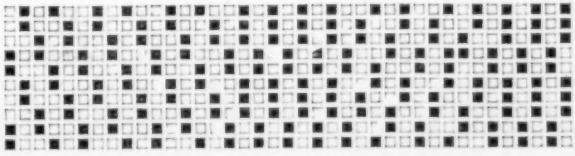


Fig. 7.

which may be all right as regards weave combination, but lacking that character which good coloring always gives.

Fig. 3 illustrates a good weave combination for a fancy tweed and will be found to give a good effect, and may be worked up in a light weight, suitable for the season. The drawing-in plan is given at Fig. 4, and the lifting plan will be found to be the first twenty-two ends of the design. A suggestion for coloring is a solid warp of light brown, flaked with a blood-red, and filled with alternate picks of flaked dark brown and white, and flaked dark brown and green. A rough finish should be given to assist in blending the whole.

Another design based upon the popular bayadere effect is shown at Fig. 5. The weave combination is a sound and pleasing one, the small mat weave contrasting favorably with the lines of warp and filling which form a vandyke across the piece. At each point of the weave the filling should be so bound as not to have a streaky appearance in the woven product, and a glance at the design will illustrate how this should be done. It is complete on 18 harnesses. The light portions in both designs represent warp, and the black portion the filling, and the lifting plan is the first 18 ends of the design.

An excellent design for a fancy worsted trousering is given at Fig. 7. A trial might be made with ends and picks according to requirements with

12 threads of 2/48 black.
4 threads of 2/48 black and white twist.
4 threads of 2/48 black.
4 threads of 2/48 black and white twist.
6 threads of 2/48 black.
9 threads of 2/48 black and white twist.

Filling to be all 24s, black. The design is complete on 39 ends, the draft and lifting plans being shown at Figs. 8 and 9. Many suitable styles may be made by reversing the directions of the patterns at various intervals with different colorings for each style. The bindings being of a firm and sound character it specially recommends itself for a light weight fabric.

NOVELTY.

A New Texture.

We think many of our readers, especially many of the designers, will be interested in the illustrations which we give, herewith, of a new fabric which has been recently invented, composed of two layers of weft, or filling, one layer having binding warp threads independent of the other, the latter being bound to the former by four series of warp threads, the weft being respectively of different materials, having no intervening floats between and one of the materials having a napped surface.

In order to give an idea of this fabric, we give a sectional view of it, and also a plan view of it, together with a perspective view, the latter being shown in various states of its manufacture.

Referring to the drawings, "A" designates a series of weft having the warp-threads "B" and "C" interwoven therewith, the threads "B" and "C" respectively passing alternately over and under each successive weft-thread of the series "A," which latter are of cotton-duck or other tightly woven similar material.

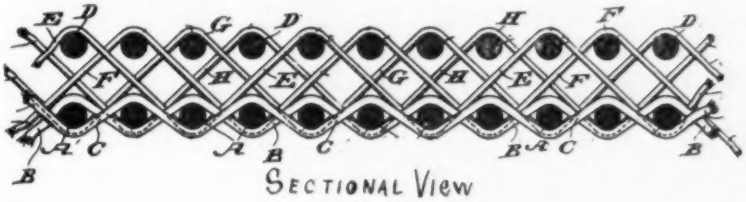
"D" designates the upper weft-threads of wool or other similar material, which are of equal number to those in the layer "A" and in the present instance directly over the same.

The layers "A" and "D" are bound together by the four series of woolen warps "E," "F," "G" and "H."

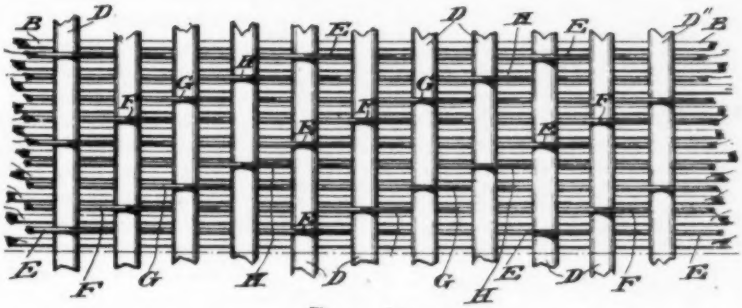
The threads of the series "E" of warps are passed over the upper woolen weft of the series "D," and then descending pass under the cotton weft of the series "A," and thence upwardly and around the woolen weft and so on, it being noticed that the woolen warps "E" after passing over a woolen weft are kept down during

the next three picks of the woolen weft. In like manner the threads of the series of warps "F" which are adjacent to the woolen warps "E" pass over a woolen weft and then descending pass around a cotton weft, thence upwardly around a woolen weft, thence downward around a cotton weft, then upwardly, and so on.

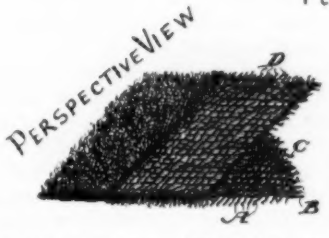
The threads of the series "G" of warps which are adjacent to the warps "F" pass around the woolen weft, thus exposing a large surface of the woolen weft, so that the same can be readily worked up to form a nap. By having the woolen warp passing below the lower or cotton weft, there are no floats formed of the said warps either between the two layers or on the surface of the fabric, thus avoiding loose or projecting threads. The woolen face is napped in the ordinary way, so as to form a fluffy surface thereon.



SECTIONAL VIEW



PLAN VIEW



weft "D," thence descending pass around the cotton filler "A" and so on. The threads of the series "H" of woolen warps pass around the woolen weft filler "D," thence descending pass around the cotton weft "A," thence upwardly around the woolen weft "D," and so on, it being noticed that the threads of each woolen warp after passing over an upper weft are kept down three picks of the woolen

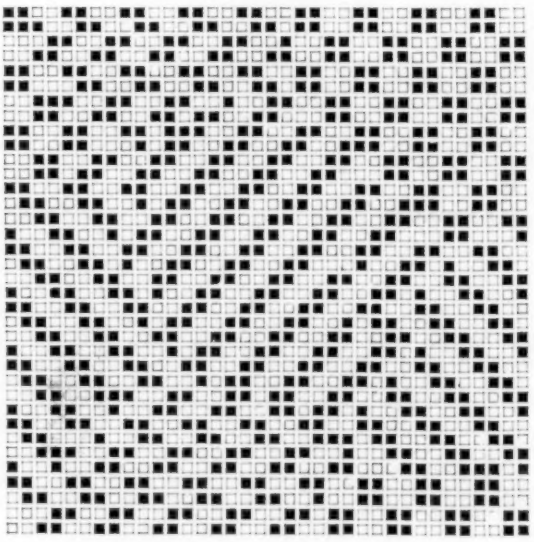
It is not a new thing to construct a fabric having faces composed of different material formed of separate layers of weft connected by warps alternately passing around consecutive wefts; but such, so far as we are aware, are provided with extra warp-threads passing between the layers forming floats. We are not aware that a fabric as herein described and claimed is old, said fabric having a napped woolen and a cotton face, each formed of an equal number of layers connected by four series of woolen warps, a warp of each series passing around the fourth consecutive weft of each layer, whereby the woolen weft-threads are freely exposed, so that the face thereof may be readily napped and none of the warp-threads forming floats either between or outside of these layers.

A Solution of Textile Puzzle.

Editor Textile World:

With this please find what I consider a correct solution of the weaving design on page 73 of the August number of your magazine. I should be pleased to hear what success others have with it, as I do not call it such a "simple weaving design."

ELMER BADGER.



An Antiquated Woolen Mill.

OPERATING MACHINERY HALF A CENTURY OLD.

Editor Textile World:

Having recently visited a small woolen mill in a western city, where the machinery and methods are at least forty or fifty years old, and the machinery in the worst possible state of repair, it suggested to me that a description of the plant would be an object lesson to the trade and mill men generally, by showing how some men secure a small measure of success with very poor tools and appliances, while other men with the best and most improved machinery, and the most advanced and up-to-date methods, make wretched failures and come to financial ruin.

The mill in question is owned by an old German and his son, who with the help of other members of their family constitute nearly the entire working force. They both smoke pipes continually and move about the wool, grease and inflammable material, apparently unconscious of any danger of fire. If one started there would be no possibility of extinguishing it, as they have no protection, not even a pail of water handy. The senior partner of the firm is also superintendent, boss carder, boss dyer and finisher, and also card tender. The junior partner is spinner, warper, wool washer, etc. The goods manufactured are coarse flannels, blankets, hosiery and knitting yarns. These goods are retailed to the German farmers of the vicinity. The hosiery and yarn is sold in the grease, but the flannels and blankets are finished.

We entered the card-room which is about 25x30 feet. It is badly lighted, but owing to the thin wooden walls in which are numerous cracks the ventilation is excellent. The ceiling is built of rough-sawed joists, overlaid by common flooring the rough under side of which together with the joists were so coated and festooned with flyings that it resembled the moss grown trees of a Florida swamp. On one side of the room stood what might be called a set of cards. It would be hard to imagine more rickety, dilapidated and dirty machinery. We were told they are about fifty years old, and one might easily believe it. Judging from the grease and dirt on them I should say they had not been wiped off more than two or three times during the half century of their existence.

The first breaker is a double cylinder machine, each cylinder 24 inches wide and about 30 inches in diameter. The clothing is beyond description. It

is so smashed down and bent out of place that it was difficult to tell which way the wire pointed. Some of the workers are almost as devoid of wire as the floor, and it is no exaggeration to say that several of them have less than half their surfaces covered with wire. The rest is broken out. There is no second breaker, but the finisher is in keeping with the first breaker, naturally in a little better condition as to clothing. There was no perceptible point on any of the wire, and we did not see any grinder. The belts also correspond exactly with the machines, being rotten, oil soaked and tied together at short intervals with strings and other devices, even harness buckles. The set of the different cylinders was also defective, and I noticed spaces at least one-eighth of an inch wide between some parts.

The manner in which these cards are fed is amusing. The senior partner who, as I have said, is also card tender, picked up an armful of wool and spread it on the old-fashioned feed-table, using his own judgment as to the proper thickness. There are no scales and no marks on the feed-apron to guide him in the least. As the wool comes off the doffer the sliver winds on a drum, layer after layer. On top of the drum is a small wooden roller, revolving by the friction of the bat under it, and as the bat increases in thickness the roller raises up until it finally touches a little iron rod suspended over the centre. This is the signal for removing the bat and is the only evening devise on the whole outfit. At the proper time the superintendent, etc., tore off the bat and spread it on the feed-table of the finisher. This is similar to the one on the first breaker, a plain endless canvas apron. If the card tender thought the bat was too thick he stretched it out, if too thin he crowded it up a little. Sometimes it was thick on one side of the card, and thin on the other.

The roving is taken off of the finisher in the usual way, two ring doffers being used, each with twelve rings, and the top and bottom rovings are wound on the same spool, after being rubbed with a five-roll condenser. Some of the threads were about one-half as thick as others, but heavy and light all went onto the same spool. I asked the boss carder how he could use such uneven yarn and he replied, "It makes no difference here, it is good enough."

In the same room is a 144-spindle hand-jack built by Alfred Jenks of Bridesburg. I do not know how old it is, but in 1876 I saw a hand-jack like it which was then worn out, but which was apparently of later construction than this one of which I write. It did not seem to be so badly dilapidated as the cards however. The head is on one end of the machine and is very inconvenient to handle, yet the junior partner of the firm told us he could spin 40 to 90 pounds of yarn per day according to size. The roving certainly spun well, considering the way it was carded, but it is not necessary to state that the wool was of a good long staple, no shoddy or other mixture being used, nor did the ring-doffers turn more than four or five turns per minute. The yarn was strong and smooth, but the individual threads were of different sizes.

On going to the upper floor we found an old picker and a warper which had been made by the spinner. You could tell that by looking at it. There was also a twister and three Mayo knitting machines of quite recent make.

We passed into another room and saw a small boiler, and an engine that very perceptibly slacked up whenever any machine was started. Within ten feet of the boiler, was a loom, weaving coarse flannel. The fireman is also weaver. Near by was a small forge and a lathe, constituting a machine shop where the boss knitter does job repairing for the people of the vicinity. Boiler, engine, loom and machine shop are all in the same room. When the power slacked up, which was often, the loom worked badly and the shuttle would break the warp, making holes an inch or two in diameter, but we did not learn that the weaver was fined for imperfections.

In another corner we saw an old gig; and in a shed, with one side open to the weather, are the dye tubs, fuller and wool-washing apparatus. This consists of a small plain tub in which the wool is soaked, and a still smaller one where it is rinsed by water from an inch pipe.

Now with such machinery as this, this firm is making goods which will wear well, and undoubtedly do give good satisfaction to the plain Germans who are their principal customers, but the goods are certainly not attractive and could not be sold through the regular channels.

We mounted our bicycles and rode away, wondering how these men could make a living with tools and machines, fit only for the scrap pile, and how they could sell their goods in a city of 4000 people, whose stores are filled with the best products of the best mills in the country, and which are sold on margins which little more than pay the expenses of those same mills, with their splendid equipment of machinery, operated by skilful workmen, and managed by experienced, highly educated and careful business men.

OUT WEST.

Southern Textile Schools.

The first Textile School in the South opened its doors on Wednesday, Sept. 14th, viz., the textile department of Clemson College, S. C., which has been thoroughly equipped for the purpose, both with machinery and a competent professor of textile engineering and assistants. In a very short time the Atlanta Textile School will begin operations, all the funds having been provided; and early next year, as soon as an appropriation can be secured from the legislature, North Carolina expects to add a textile wing to its Agricultural and Mechanical College at Raleigh.

Flax Spinning In Cork.

Consul Swiney writes from Cork, Ireland, in regard to a large spinning and weaving establishment in that city. The company employs 800 workmen, and spins flax grown in Russia, France and Belgium, in addition to that produced in Ireland. This, adds the consul, is necessary in order to fill orders for different grades of yarn, the French flax being very fine, that from Belgium slightly heavier, while Russian flax is coarse and strong. The growth and manufacture of flax, says Mr. Swiney, has been carried on with success in different countries of Europe during many years, and it would seem that in the United States, with its infinite variety of soil and climate, this industry should flourish equally well. It is said by Cork manufacturers that America is their best market.

—The cotton drawing frame is the most simple machine in its construction, yet its effects are the most important of any machine in the whole of preparatory processes.

—The gross earnings of the railways of the United States for the year ending June 30, 1897, as reported for an operated mileage of 183,284.25, were $1,122,089,773.

—London has the advantage of leading the fashions in men's wear, just as much as Paris and Berlin have in ladies' wear; and most of the crowned heads in Europe are reported to get their attire from here.

—Unmercerized cotton threads stretch 11 per cent. of their length before breaking and those mercerized without tension 17 per cent.; while those mercerized under tension showed the same stretch as ordinary cotton.

—The breaking strain of cotton cloth is greatly increased by the mercerizing process, and since this is the case, whether the process takes place under tension or not, it is evident that the shrinkage of the fibre is not the cause of the increase of strength of the cloth, but that the strength of each individual fibre is increased.

KNITTING DEPARTMENT.

The Knit Goods Situation.

Although many mills are sold fully up to their production, the melancholy fact remains that no positive improvement in prices is to be noted. The effect of attempting to stiffen quotations has invariably been to throw the trade upon other goods. Prospects for trade are excellent, but the outlook for bigger margins is not cheering. While orders are better distributed than a few months ago, striking unevenness is yet to be noted, especially in underwear and particularly in cotton underwear. More judgment is steadily being exercised in selecting. It is lack of real merit in lines that is putting some mills in such dumps. Hosiery has not been faring as well as underwear, of late, and some agents have positively suffered. The government's immediate demand for underwear has done a great deal to help that branch of knit goods. Not only did Uncle Sam take the product—he cleared up many not particularly desirable lines that are well out of the way. These lines might not have proved a great weight, but they would have cost dealers many a dollar by diverting their attention in an attempt to work them off. The generally healthful condition of the underwear trade is shown by the fact that while buyers have for weeks been complaining of the backwardness of deliveries of fall orders, cancellations have been scarcely appreciable. The liberal orders for heavy weights have brought about large-sized duplications on the part of jobbers. The most noticeable tendency in underwear is toward fancies, which are shown in wide variety. It is to be expected that, as is hosiery, most of the business secured on fancies will be almost clear gain, for experience has shown that staples are not materially affected thereby. Besides, price competition on these fancies will not be anything like as close.

Mercerized cotton underwear, with a silky effect, the lustre of which long remains, is shown extensively in many exquisite shades that are sure to attract the best trade. The volume of trade is about on a par with last year, so it is hard to see how several manufacturers who have cut their prices on cotton underwear can get even. The caution advised in this column, for two previous months, regarding increased care in the selection of fancies in hosiery must be still further emphasized. Importers' stocks show their realization that stockings must now be something more than fancy in order to sell. Narrow stripes, woven vertical stripes, and similar styles, have the preference. Buying abroad has been rather gingerly done and prices are not satisfactory to manufacturers. Fine clocking is widely seen, and lisle and lace hose are in frequent request. Broken plaid designs, embroidered and extracted patterns, diamonds and vertical stripes, also meet with ready favor.

Full-fashioned hosiery machinery is exceptionally well employed. Low-priced goods have not been moving as freely as usual the last month. The arriving samples for next season's golf hosiery indicates that the tendency toward lighter grades is to be maintained. Many hosiery offers have lately been declined in Chemnitz because they were too low. The cool spell, of late, has been especially appreciated by the underwear men, for the long-continued high temperatures enabled buyers to get hold of many odd lots at shaved quotations. The falling mercury has already stimulated duplications in heavy weights. The stagnation in wool and the great cotton crop are dispiriting features of moment. Underwear dealers who pretend to be up-to-date will be sure not to overlook the offerings in cash-

mere and light weight worsteds in colors, which are shown in larger assortment and better finish than ever before. Their patterning, too, marks a decided advance.

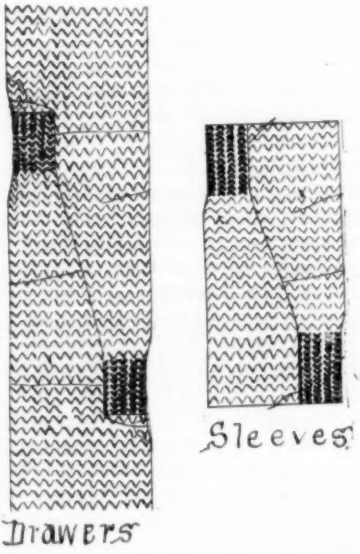
New Stitches for Knit Goods.

We illustrate, herewith, two new ideas for knitting fabrics. The first one to which we call attention is one for making blanks for knitted goods, relating to the manufacture of clothing, more particularly to sleeves and legs of knitted garments, in which the body of the sleeve, and leg portion, is knit with one character of stitch, and the wristband, or anklet, formed integrally with the body part, is formed with a stitch of a different character.

In order that one may see what is referred to, we furnish two drawings, one showing a blank for sleeves and the method of cutting sleeves therefrom, and the other a blank for drawers-legs and the method of cutting the same.

As the sleeves and legs of knitted garments are commonly produced, we believe, a tubular knitted blank has been formed having alternate sections throughout the tube of stitches of different character, a comparatively long section for the body portion of the sleeve being formed with one kind of stitch, usually a "tuck-rib" stitch, and shorter sections being formed integrally with the longer sections for the wristbands and anklets of a different stitch, usually termed "plain-rib" stitch. The tubular blanks are usually produced of indefinite length, and in the formation of sleeves for undershirts or like garments a section is cut from the tubular blank consisting of a short section of plain stitch and a long section of tuck stitch. This blank of two sections is now cut to form two sleeves, the body portion of said sleeves being formed of the tuck-stitch fabric and the cuffs or wristbands of the plain-stitch fabric.

In cutting the two sleeves the tubular blank is cut on two lines which commence at the section of plain stitch and extend toward each other for a distance of twelve or fifteen inches, where the cuts meet and are then continued in a single cut to the end of the tuck-stitch section. This results in the formation of two sleeve-sections, each being properly formed and tapering toward the cuffs or wristbands; but this manner of producing the sleeves is attended with great waste and loss, inasmuch as the wedge-shaped pieces of the tubular blank which compose the portions of



the blank lying between the lower portions of the sleeve-blanks are practically worthless and are usually thrown away.

In the formation of drawers-legs of knitted fabric by methods heretofore practiced, a tubular knitted blank substantially like the blank referred to is employed, with the exception that the blank has two sections of plain-stitch fabric, one section at each end of a long section of tuck-stitch fabric. This blank is cut into two drawers-legs, and as each leg-section must have an anklet the blank is so cut that the two drawers-legs extend in opposite directions, an anklet being cut from each of the short sections of

plain-stitch fabric at each end of the tuck-stitch section from which the body portion of the leg portions is formed.

The legs of the drawers are usually cut in proper shape and upon curved lines approximating the curved lines of the thighs and calves of the human leg, and such curves are so opposed to each other in cutting the blanks for the drawers-legs that much fabric is wasted in the cutting of the two blanks between such curved lines, besides the comparatively large portions of the plain-stitch sections which remain after cutting the anklets therefrom. This waste material amounts to considerable when it is considered that knitted garments are made in large quantities and adds greatly to the cost of production.

In order to reduce the waste in cutting the legs of drawers from a blank like that last described, it has been proposed to utilize the short sections of plain-stitch fabric for forming both the anklets or cuffs of the legs and also the waistbands of the garment; but garments with such waistbands are of an unusual character and have not come into general use.

The object of the idea here alluded to and illustrated is to reduce the cost of manufacturing knitted wearing-apparel of the usual and ordinary character, in which the body portion of the sleeves and legs is all of one character of stitch and the wristbands or cuffs and the anklets are of a different character of stitch, and to provide knitted blanks which can be cut up into sleeve-blanks and blanks for drawers-legs having integral wristband and anklet sections without the formation of waste pieces.

The second stitch to which we desire to call attention is that exhibited in figures 1 and 2, which represent exaggerated views of pieces of knitted fabrics, having a stripe formed therein, as shown. The body is a knitted fabric having a stripe, or stripes, parallel with the wales.

The scheme consists in interposing between adjoining wales of a knitted fabric a chain of stitches parallel with the wales and engaging with the knitting-yarn by being wrapped around the yarn where the same crosses from wale to wale, the purpose of this chain of stitches being to form in the knitted fabric a longitudinal stripe, which may be used alone or may be combined with transverse

FIG. 1

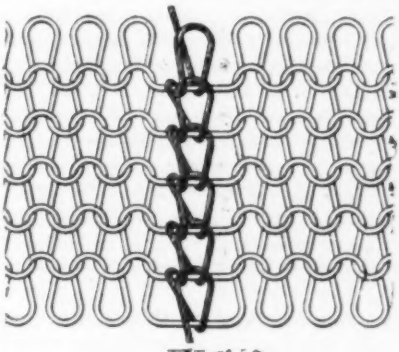
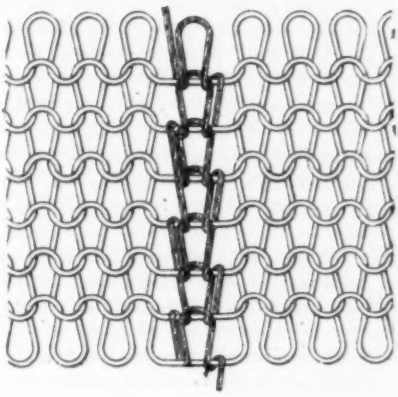


FIG. 2



stripes formed by means of change in the color of the yarn, whereby the knitted courses are produced, the result being a plaid effect.

Each of the wales consist of six courses of stitches, and midway between the wales are interposed a chain of stitches which constitutes the stripe, this chain having a stitch for each course of the knitted fabric.

Any ordinary knitting-machine can

be used, introducing at each point where a stripe is to be produced a needle supplied with yarn independent of the knitting-yarn, so that it will produce a continuous chain of stitches, this needle being operated independently of the knitting-needles so that where it occurs a stitch of the knitted fabric will be dropped, and the knitting-yarn can be laid across the face of the striping-needle below the latch, whereby, when the needle descends so as to draw a new stitch, the knitting-yarn will be cast off and knocked over with the striping-stitch already on the needle. Hence the striping-needle will, on each operation descend behind the knitting-yarn and rise in front of the same, so as to cause the striping-yarn to be wrapped around the knitting-yarn where the latter crosses from wale to wale of the fabric in the manner as shown in the drawings.

The difference in the character of the wrap of the striping-yarn shown in the two drawings arises from the fact that in making the fabric shown in Fig. 1 the striping-yarn guide travels around the striping-needles, so that the yarn always engages with the knitting-yarn on the same side of the needle, while in making the fabric shown in Fig. 2 the striping-yarn guide reciprocates, whereby the yarn engages with the knitting-yarn first on one side of the striping-needle and then on the opposite side of the same.

Although it is preferable to form in the chain of striping-stitches a stitch for each course of the knitted fabric, this is not necessary, as there may be two or more stitches of the striping-chain for each course of knitted fabric, or, on the other hand, there may be two or more courses of knitted fabric for each stitch of the striping-chain. This stitch may be applied to ribbed fabrics as well, and the stripe may, if desired, comprise two or more wales instead of but one.

—Tans and black in cheap and medium grade hosiery are still the best sellers.

Chemnitz Knit Goods.

Editor Textile World:

Yarn is about as good a barometer of the textile markets as one can find. Last week was one into which a little more life was injected than in any one of the last ten. One or two big orders bore down the balance in favor of the manufacturers. This was the case, however, with combed yarns. Cottons did not sell so well. Prices in cotton yarns went down, not up. Why, does not appear unless too many mills have been built. I heard nothing of overproduction. English merchants are here making every effort to market the yarns of Manchester and other English cities.

"Day by day the United States are emancipating themselves from European hosiery exporters." Thus says a writer in a recent report sent to a leading paper of this place. This is true only in part. It applies to cheap goods only. It will be a long time before buyers cease to come to Chemnitz for better grades. Because a few houses have ordered rough goods from the Fort Wayne people, it is no basis for the belief that "it's all up" with manufacturing here. No doubt Bennington, Vt., Providence, R. I., Philadelphia, Pa., and Fort Wayne are making it warm for the knitters of this district; but no man who knows anything about the knitting business, its growth and requirements, will look for anything like a large falling off in fine goods for fifteen or twenty years.

Cheap goods? yes. These are falling off so fast now that it is only a question of a few years when Chemnitz can compete no longer in such goods. How very important the United States are, appears only after investigation and comparison. The accompanying statistics of exports, prepared by the very best authorities, indicate, as nothing else can, the importance of the United States market to Chemnitz manufacturers.

Before, during, and even now, after the war, orders are anything but very big. Lately a livelier disposition was shown. No one, however, has had to

Value of exports from the District of Chemnitz to the United States during the fiscal years ended June 30, 1898 and 1897.

ARTICLES.	1898.	1897.
	$	$
1 Bicycle lamps		4,037.37
2 Cashmere	10,237.41	11,693.96
3 Cotton Hosiery ...	3,223,864.84	4,324,159.47
4 Silk Hosiery	52,530.90	40,258.73
5 Woolen Hosiery ...	53,036.58	221,634.28
6 Cotton Gloves	244,887.81	233,107.95
7 Kid Gloves	3,012.66	15,276.50
8 Silk Gloves	112,899.28	115,450.53
9 Woolen Gloves	36,161.66	29,881.58
10 Dress Goods	27,511.07	90,538.27
11 Linen Goods	25,550.57	57,910.29
12 Machinery	78,569.79	55,897.82
13 Miscellaneous	58,066.94	35,778.64
14 Mufflers	47,587.95	41,078.21
15 Paper (fancy)	10,653.96	19,811.88
16 Toys	12,896.74	7,949.39
17 Trimmings and Beaded Goods	123,143.50	132,309.16
18 Underwear	74,869.44	158,921.32
19 Upholstery Goods	63,778.44	66,940.18
20 Woolen Goods	18,855.72	31,094.22
21 Wool combing cards	9,247.75	10,728.98
22 Flowers	892.50	
Total	4,288,255.51	5,968,458.73

sit up nights to book orders. Last week was better than any for a long time. A few good orders were given for fancies, at fair prices. No one believes this season will be anything like the last, in this line. Nice goods will always go. Staples are in demand. Richelieus, Rembrandts, ribbed goods, in lisle, maco and plain cotton, have been called for in satisfactory quantities. Some embroidered, clocked, lace hose went well. Goods in the lower grades are so cheap that no one wants to touch them. Orders, if taken, are booked only on the basis that refusal to fill would lead to the loss of other important orders.

Reports reaching here from the West of the United States have hundreds of millions of bushels of surplus wheat in this year's harvests. Every extra bushel stands for an extra half-dozen hose. South America did nothing; England bought quite large quantities for the home trade; Canada and the East did not come, i.e., sent few buyers, but ordered by post, taking quite a lot of fancies for next spring.

Here every glove shop is a hive. Never were manufacturers busier. Prices too are satisfactory. The orders in and coming are satisfactory. Prices went up in satins 10 to 15 pfennigs. Half silks, so much neglected last season, are going well and look out on fair prospects. France and England were this week's biggest buyers, taking quantities larger than ever before. The effect has been to stiffen prices. The great demand is for buttoned goods.

Day by day the underwear men are improving. Business was never better. Orders come in from the United States daily. Nor are they small orders. This is put down to a scarcity in stocks on that side. Too many orders were booked for summer wear. The warm weather of August took off all the supplies of summer and sporting goods. Nothing new is to be noted. Plaids, strange to say, went very well in shirts. Prevailing prices are low, very low.

ARISTIDE.

Chemnitz, Sept. 6, 1898.

Something to Think About.

Our readers in the knitting mills should be interested in the following questions that have been put to students in the art of knitting by the Nottingham University College and the Leicester Technical School, England.

We wish knitters would carefully consider these questions and write us, for publication, their answers to them. For meritorious articles, we will pay cash.

The syllabus as laid down by the City and Guilds of London Institute is divided into two grades, viz.: The elementary course and the advanced or honors course. These are divided somewhat on the lines of the following:—

ELEMENTARY COURSE.

Knit fabrics, their general construction and uses.

Framework knitted fabrics, hand and machine made.

Warp knitted fabrics.

Method of calculating the gauge of frames.

The construction and working of circular frames with bearded needles, and with latch needles.

The principles upon which yarns used in the hosiery trade are numbered.

Drawing of various knitted loops and working out of patterns.

Methods of making and putting together the separate parts of plain and fancy hosiery of all kinds.

ADVANCED, OR HONORS COURSE.

Principles of spinning the various kinds of yarns used in the hosiery trade.

Study of the system of numbering yarns and comparisons of same.

Combination of various numbers of single yarns, and practical problems, etc.

Construction and action of various plain and rib rotary frames, together with all recent additions to same.

Construction and action of rotary warp looms.

Formation of the various kinds of warp loom stitches and the principles of designing.

The manufacture of gloves.

Machines used in the joining together of knitted garments and fabrics, their principles and mode of working.

The trimming and finishing of hosiery.

Principles of costing and profits.

Construction and working of winding machines used.

Depreciation of Mill Machinery.

Agent H. F. Straw of the Amoskeag Mills, Manchester, N. H., recently testified, in the hearing of that corporation against the city of Manchester, for a reduction in the taxable valuation of its property, that experience had proved that the life of machinery did not exceed twenty-five years, and that after thirty years it was valuable only for scrap. He gave the amount of machinery still in the mill which was there in 1872, and said that it could be replaced now for $100,000. Although that machinery had had a long life, other machinery put in since then had been thrown out at the end of twelve years. In one instance, machinery worth $100,000 was thrown out after twelve years. He thought that the original first cost of machinery in the Amoskeag Mills in 1897, was about $5,049,000.

Mr. Straw said that machinery fifteen years old was worth 30 per cent. of its cost. The machinery of No. 9 mill was mostly started in 1881 and 1882 and to make it equal to modern machinery would cost so much that the present value is only one-third its original cost. The carding machinery placed at 30 per cent. of its cost was over-valued, he said.

Regarding machinery that had been running ten years, Mr. Straw said that its value was about 50 per cent. of its original cost. The Jefferson Mill, he said, had been running just about ten years, and it was possible to make a very accurate estimate on its value. The cards cost $725 and he reckoned the present value at $350. He also gave figures about other machinery.

According to the experience of the Amoskeag, machinery ten years old, was worth 50 per cent. of its original cost, machinery fifteen years old 30 per cent., and machinery 25 to 30 years old 2½ per cent., or practically scrap iron. From this a curve of depreciation could be easily drawn. A table to indicate this was introduced. Mr. Straw said that this table was constructed on his actual experience with Amoskeag machinery.

Concerning mill buildings, Mr. Straw said that it was customary to allow 2 per cent. per annum for depreciation. The old No. 1 and 2 mill, built in 1840, he said, originally cost $111,772.50, and it has depreciated 46 per cent.

—Cotton mercerized under tension has less attraction for dyes than mercerized and shrunk cotton, and since the chemical composition of both appears to be identical, the difference in dyeing properties is probably due to the different physical condition of the fibres.

POWER DEPARTMENT

ELECTRICITY—STEAM—WATER.

An Exhaust Fan.

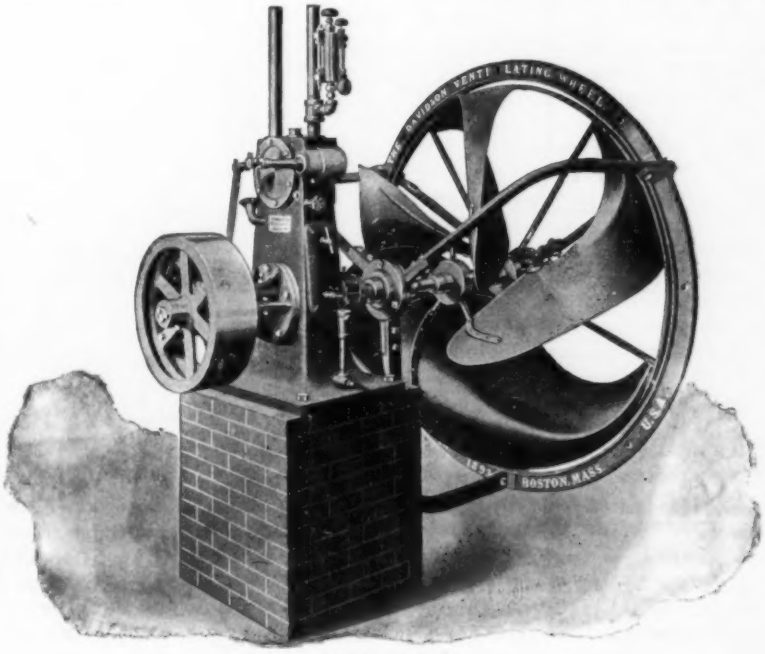
The demand for exhaust fans in places where no power is used, reached a point some time ago where it was deemed expedient to meet it.

The exhaust fan with a directly connected motor was the legitimate outgrowth of this demand, but there were some isolated places where neither shafting nor electricity were at hand, but fans badly needed which made the steam-driven fan a necessity.

The outfit shown in the accompanying illustration, of a Davidson Fan with a direct-connected Case engine, is a combination of a fan and engine, each an old success in its separate line. The two together make a superior unit for ventilation. Originally designed for places with only steam in use it is now being employed where other forms of power are at hand because of its many advantages.

A bad boiler-room can be easily cooled or ventilated with this outfit without introducing a long line of shafting and belt. For dyehouses such an outfit is peculiarly adapted.

Both the Davidson Fan and the Case Engine are widely known and used. The fan is built very strong and heavy and is especially durable and efficient. The engine is compact, light, automatic, runs smoothly and has large wearing surfaces, and is widely used in the United States Navy. Thus the fan and engine, each having passed the experimental stage, form a combination hard to beat. Both fans and engines are carried in stock by the Massachusetts Fan Co., of Boston, who furnish catalogues, plans and estimates free of charge.



EXHAUST FAN.

Setting Engine Valves.

GEO. W. EOWLER, A. S. M. E.

THE PUTNAM ENGINE.

Copyright, Engineers' Magazine.

The valve gear of the Putnam engine is automatic in its action and is capable of causing the cut-off to take place at any point throughout the whole length of the stroke dependent upon the load carried and the speed attained.

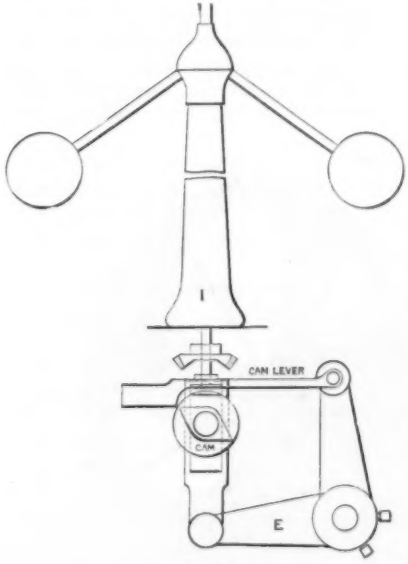


FIG. 1.

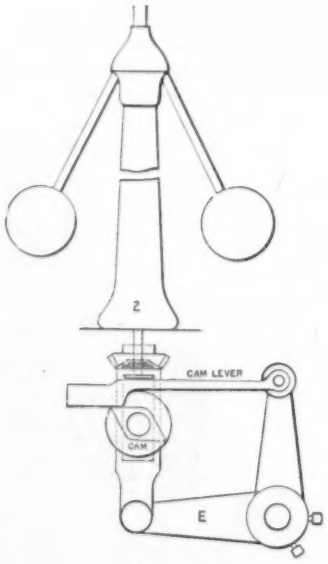


FIG. 2.

Four valves are used for admitting and exhausting the steam from the cylinder. These are of the balanced poppet type; that is to say, they are double seated poppet valves, there being a slight variation in the diameters of the two.

The smaller and lower valve has an outside diameter that is just a trifle less than the inside diameter of the upper valve, permitting it to be put in position by slipping down through the upper seat.

It will be readily understood that this does not secure an absolutely perfect balance and that there is an excess pressure on the upper seat tending to keep the valve closed. This excess, however, is small and only equals the pressure of the steam on a ring whose area is equal to the difference in the areas of the top and bottom valves.

These valves, both admission and exhaust, are provided with stems projecting down through stuffing boxes in the bottom of the steam chest and have no mechanical connection with the operating mechanism.

The valves are opened by the lifting of the lever 3, which, when not in motion, rests upon the tip shaft 19. This lever is loosely pivoted to the arm 4 by which it is moved to and fro as will be described later. The valves are lifted by cams fastened to the cam shaft No. 20.

Their shape is that indicated by 1, and they are made to rotate once for each two revolutions of the engine. The cam shaft itself is driven by a mitre gear meshing with one on a stud gear as shown in the engraving, Fig. 3, which is, in turn, driven by a spur gear on the main shaft.

It is evident, then, from an examination of Fig. 6, that if the cam shaft, 20, is made to revolve, the cam will strike the lower side of the lever, 3,

lift it and with it the valve above. Hence, if the pivotal point of the lever 3, on the arm, 4, were to remain stationary, it is readily seen that the

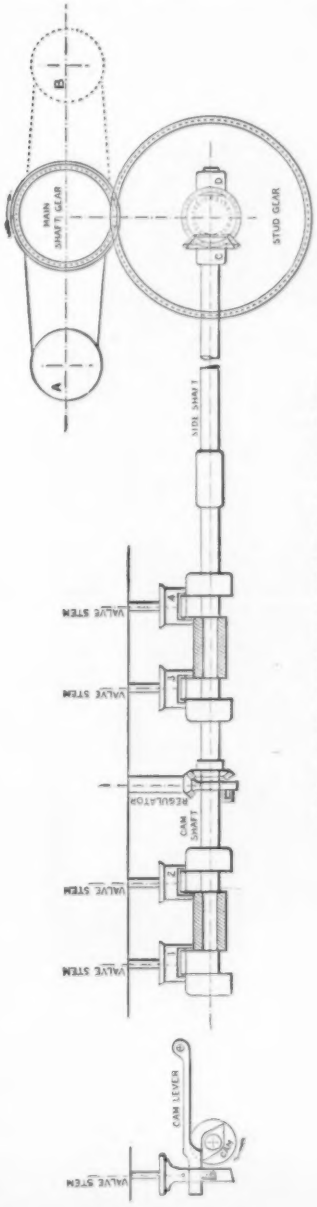


FIG. 3.—DIAGRAM PARALLEL WITH SIDE SHAFT.

point at which the valve opens and closes would be the same at each stroke. This, however, is varied by the action of the governor as follows.

The governor is of the ball type and by examining the connections between the balls, 40, (Fig. 6.) and the stirrup rod, 16, it will be seen that as the balls fly out and up, under the influence of centrifugal action, the rod is pushed down.

The power for driving the balls is taken from the cam shaft by bevel gearing as shown in both Figs. 5 and 6.

The stirrup rod leading down from the governor straddles the cam shaft and is connected to the arm "E" (Fig. 5), or 6 (Fig. 6).

This arm is, in turn, held to the rocker arm shaft, 22, which carries the arm 4.

It is evident then that, as the speed of the engine increases and the governor balls fly up depressing the rod, 16, and with it the arm, 6, the arm, 4, will move toward the valve and carry the lever, 3, with it.

This lever is cut away on the under side to such an extent that when the cam reaches that point, it becomes disengaged from the lever and allows the latter to descend. Hence, as the descending of this lever marks the point of closing of the valve, and as this, in the case of the steam valves is the point of cut-off, it is evident that this point will take place earlier in the stroke as the speed increases and the lever, 3, is moved farther and farther to the left, causing the cam to effect a corresponding earlier release in the valve lever.

All of the valves are operated in the same way, by cams of the same shape, but only the levers corresponding to the steam valves are attached to lever rocker arms, 4.

The levers of the exhaust valves are pivoted to fixed brackets as shown in Fig. 5, so that there is no variation in the points at which they open and close after once having been set.

The setting of the valves is an exceedingly simple matter. The first adjustment to be made is that of the regulating governor. The set screws holding the regulator rocker arm, 6, to the rocker shaft, 22, are slackened

so that it can turn freely and the balls of the governor blocked in their highest position as in the left hand diagram of Fig. 4.

At the same time the cam lever, 3, is moved to the left until the cam will just clear its lower surface when the admitted to the cylinder; a state of affairs obtaining when the lever, 3, is moved so far to the left that it cannot be engaged and lifted by the cam.

The engine is now in a position for the setting of the valves.

First place the crank on the dead

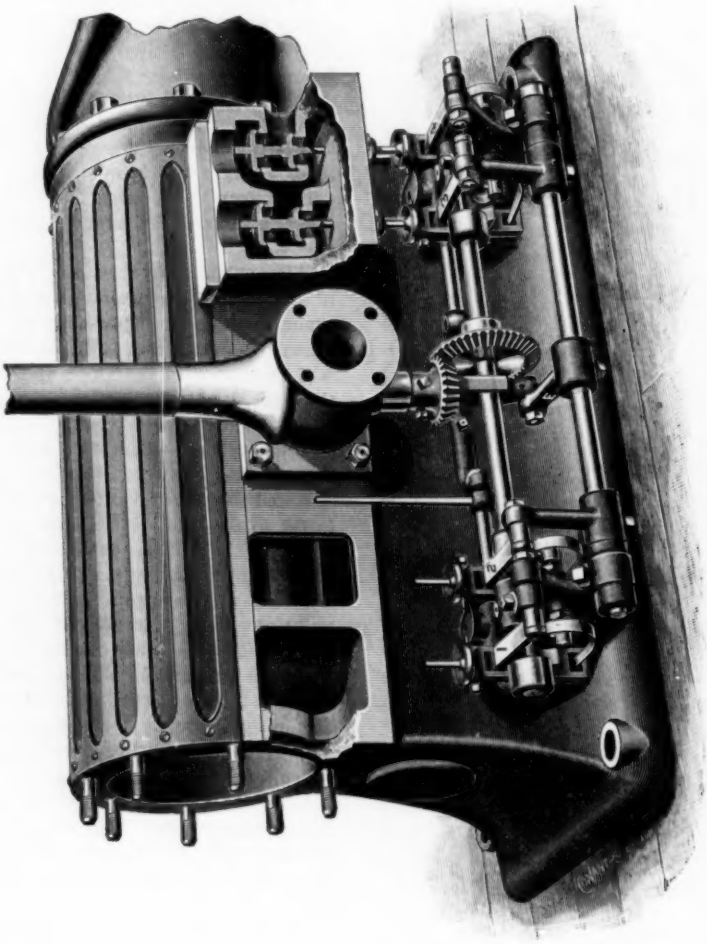


FIG. 5.

set screws on the regulator rocker arm 6, are tightened. This, of course, is done for both of the steam valves. The reason for this preliminary adjustment is that it is desirable to so adjust the regulating apparatus that, when the engine has reached its maximum speed and the governor balls are at the highest point, no steam will be

center, next the cylinder and loosen the cam, 1, of the outer end on the cam shaft. The valve is on its seat and after determining the amount of lead (the builders recommend 1-16 in.) make a mark on the valve stem, 9, and measure its distance from the face of the stuffing-box gland. Then turn the cam on its shaft until is has raised the

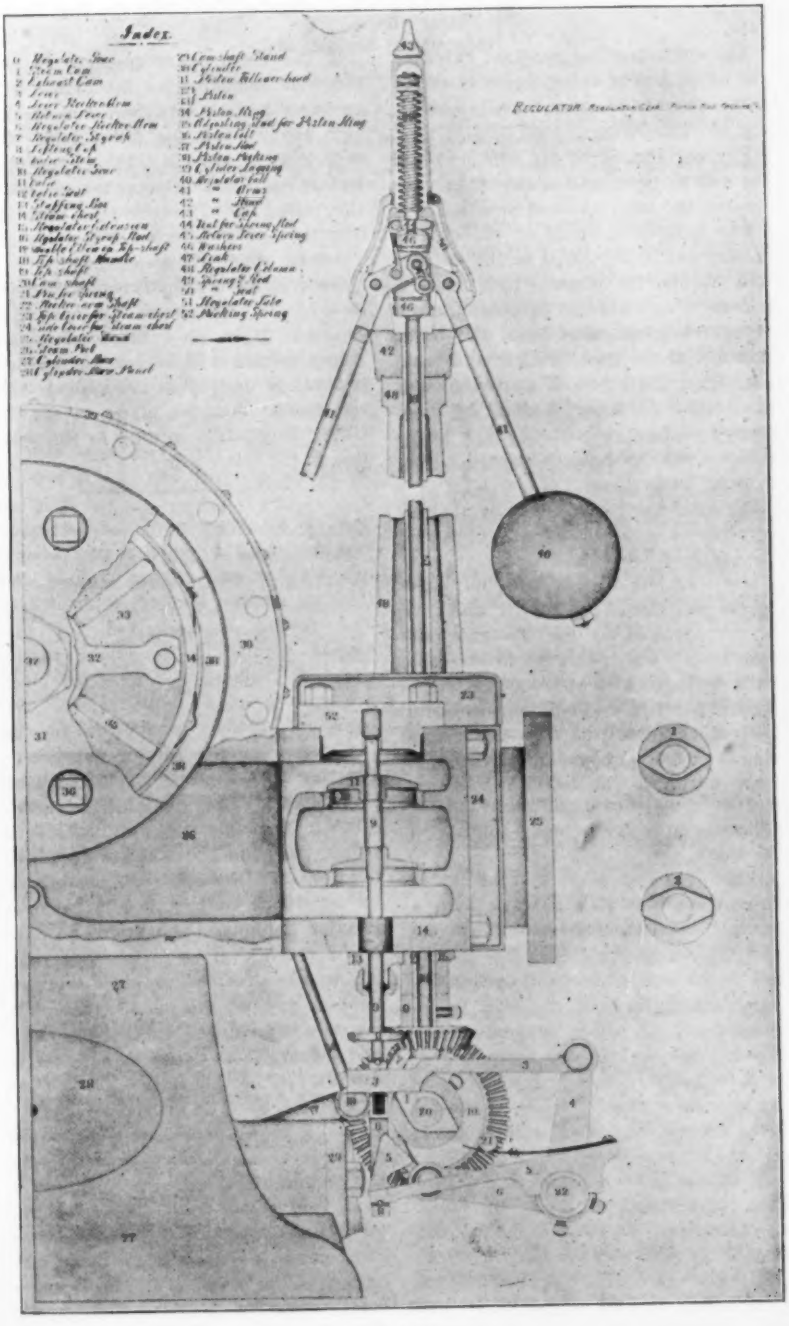


FIG. 6.

valve stem 1-16 in. when its set screws should be tightened and the cam made fast.

The corresponding exhaust valve at the other end of the cylinder is set in same way at the same time, the builders recommending a lead of 1-16 in.

For the setting of the other valves the engine is turned to the other center and the same method repeated.

The maximum speed of the engine is very easily regulated in the adjustment of the governor. It is merely necessary to ascertain by computation or otherwise to what point the balls will rise at the speed desired and then so adjust the lever, 6, on the rocker shaft that the lever, 3, shall be in a proper position to cut off at a point which shall maintain this speed under a given load.

For example: Suppose the number of revolutions is to be 125 per minute and the point of cut-off half-stroke.

The lead has already been adjusted by the settings of the cam, 1, and this is not changed by the governor adjustment. The point to which the balls will rise at a speed of 125 revolutions per minute is determined and the engine turned so that the piston stands at half stroke. The lever, 3, is then moved to the left until it just escapes from the cam and the regulator rocker arm is again made solid with the shaft.

When the engine is started under these conditions it will work with a gradually shortening cut-off as its speed increases until it, at last attains full speed and a half-stroke cut-off. After which time, if the load is decreased and the speed increased causing the balls to rise, the lever, 3, will be moved still further to the left causing an earlier cut-off, while, if the reverse occurs the cut-off will be later, and the average speed maintained.

In all engines it is necessary to provide for running in either direction. In the case of the Putnam engine this is done by reversing the motion of the cam shaft relatively to that of the engine itself. The top of the cam shaft must run outwardly from the cylinder. The reversing of the engine is accomplished by means of the mitre gear at the crank shaft end of the cam shaft, Fig. 3.

If the main shaft revolves in the direction indicated by the arrow, the proper direction will be given to the cam shaft when the mitre gear "C" is located as shown in the engraving. But if it were to change places with the collar "D" it is evident that its direction of revolution relatively to the main shaft will be changed.

Since, however, the direction of rotation of the cam shaft must remain constant, it is the crank shaft itself whose motion will be reversed which is what is desired to accomplish and the engine may be made to run in either direction according to the position of the mitre gear.

—The machines used for preparing cotton roving to spin coarse counts are slubber and roving frames; for medium counts, slubber, intermediate and roving frames, and for fine counts, slubber, intermediate, roving and jack frames. All these machines are spoken of as "fly frames," because all of them have flyers on the top of the spindles for the purpose of twisting and winding the rovings on the bobbins. They are all constructed alike in principle, the only difference being, that one is made stronger and heavier than the other on account of its having to make much larger and heavier bobbins. The slubber, making a much coarser roving than any of the other frames, requires a larger bobbin, and so the spindle gauge is greater. The flyers are also stronger and larger. The gauge of slubber is usually from 8 to 9 inches, that of intermediate 6 to 7 inches, of roving frame 5 to 6 inches, and of frame jack 5 inches. The slubber will make say 5 hank roving, intermediate 1 hank, and roving frame 2½ to 3 hank, to spin say 32's mule or throstle. The term gauge as applied to these machines is the distance of one spindle from another, generally measured from the centre of one to the centre of the other.

DYEING DEPARTMENT.

Dye Recipes for October.

The following recipes appear in the Dyers' Supplement, which is issued each month by the TEXTILE WORLD. The Supplement contains the colored samples, dyed according to recipes given. The selection of samples is carefully made, and it is the aim to show shades which are of especial interest to the dyer, and which the requirements of the market demand. The Dyers' Supplement is a 16 page pamphlet, in convenient form for preservation. Subscription price for the TEXTILE WORLD with the Dyers' Supplement is $3.

RECIPE NO. 145.

Light Green on Worsted Yarn.

Acid Green on 100 lbs. worsted yarn.

Prepare dye bath with

2 lbs. Acid Green 5921.
(The Hanna-Schoellkopf Co., Philadelphia, Penn.)
4 lbs. Sulphuric Acid.
10 lbs. Glauber's Salt.

Enter in yarn at 140°. Bring to boil while turning, and turn to shade at that heat.

Acid Green 5921 produces a fast shade of green, which is very brilliant. It does not rub, dyes level, lifts slowly on the fibre, and can be used to advantage in combining with other dyes in shading. (See recipe No. 129 in the September Supplement).

RECIPE NO. 146.

Orange on Cotton Yarn.

Direct Brown B S on 100 lbs. cotton yarn.

Prepare dye bath with

1½ lbs. Direct Brown B S.
(John J. Keller & Co., 104 Murray St., New York.)
20 lbs. Salt.

Enter in yarn at boil, and turn one hour at that heat. (See recipe 150, this issue, for comments).

RECIPE NO. 147.

Medium Blue on Worsted Yarn.

Reduced Indigo on 100 lbs. worsted yarn.

Have bath of 100 gallons of water, at 122° F., then add to it

5 lbs Redecteur.

Stir and add to the same bath

6 quarts Reduced Indigo.
(The Jaeck Bros. Co., 62-68 North 11th St., Brooklyn, New York.)

Stir well and let settle, then skim off the froth and enter in enough of yarn to comfortably lie in the bath, giving a turn in the bath, and letting it stay under ten minutes; lift out, wring, air, and again enter and repeat the operation in the bath, without any addition of the Indigo or Redecteur. After the second dip, pass the yarn through a slightly acidulated bath after washing out of the Indigo bath.

In dyeing indigo blues with the Reduced Indigo, by giving the yarn more dips, wringing and airing each time, the darker will become the shades of blues; and as the yarn will dye at a low temperature, it gives the dyer a good chance to handle the goods. While dyeing fine shades of indigo blue, both light and dark shades can be dyed at a small cost with the use of this dye. (See recipes 100 and 104).

RECIPE NO. 148.

Black on Cotton Yarn.

Zambezi Black on 100 lbs. cotton yarn.

Prepare dye bath with

5 lbs. Zambezi Black 3 B.
(New York & Boston Dyewood Co., 55 Beekman St., New York.)
20 lbs. Common Salt.

Enter in yarn at boil, and turn one hour at that heat, lift out and enter a second, or diazotizing, bath of

3 lbs. Nitrate Soda.
9 lbs. Muriatic Acid.
3 lbs. Blue Vitriol.

Turn cold for twenty minutes, wash, and develop with

¾ lb. Developer M T.

Turn twenty minutes cold; wash.

The above color is a new product, and produces extra fast dyeings which do not bleed or crock. By adding the

Blue Vitriol to the diazotizing bath improves the shade, and makes the color faster. (See recipe 124 for a black from Zambezi Black D).

RECIPE NO. 149.

Reddish Violet on Worsted Yarn.

Acid Violet R on 100 lbs. worsted yarn.

Prepare dye bath with

2 lbs. Fast Acid Violet R.
(Victor Koechl & Co., 122 Hudson St., New York.)
4 lbs. Sulphuric Acid.
10 lbs. Glauber's Salt.

Enter in yarn at 120° F., bring to boil while turning, and turn to shade at that heat.

Fast Acid Violet R dyes a very even shade on the fibre. It is fast, and does not rub off; and besides being useful in itself, it is an excellent dye to use in combining with other acid dyes. (See recipe 133).

RECIPE NO. 150.

Orange on Cotton Yarn.

Direct Brown B S on 100 lbs. cotton yarn.

Prepare dye bath with

3 lbs. Direct Brown B S.
(John J. Keller & Co., 104 Murray St., New York).
25 lbs. Salt.

Enter in yarn at boil, and turn one hour at that heat.

Direct Brown B S will be found very valuable on account of its rich and bloomy cast, being well adapted for mixing with other direct dyes for a variety of shades. (See recipe 146, this issue).

RECIPE NO. 151.

Medium Green on Woolen Cloth.

Anthracene Green E B on 100 lbs. wool cloth.

Prepare dye bath with

3 lbs. Anthracene Green E B.
(C. Bischoff & Co., 87 Park Place, New York.)

Enter in cloth at 100° F., bring to boil, run one hour at that heat, then add to the bath

8 lbs. Acetic Acid.

Turn till bath is exhausted.

Anthracene Green E B will dye a fast color, which will stand soaping and sunlight. It will not rub off, and will give a perfectly level color. It can also be dyed on a chrome mordant, and will combine with other alizarine colors.

RECIPE NO. 152.

Light Blue on Worsted Yarn.

Phenocyanine T B on 100 pounds worsted yarn.

Mordant for 1½ hours at boil, with

3 lbs. Bichromate of Potash.
2 lbs. Tartar.

Wash and dye in a bath of

10 lbs. Phenocyanine T B.
(A. Klipstein & Co., 122 Pearl St., New York.)
2 lbs. Acetic Acid

Enter in yarn at 130°, bring to boil while turning, and turn to shade at that heat.

Phenocyanine dyes a bright and full shade of blue with 10 per cent. of the color, and with the above amount, an inexpensive blue is obtained. The color is fast to all mill tests. and dyers of fine piece goods and raw stock will find it to be of great advantage. (See recipe 140).

RECIPE NO. 153.

Medium Green on Cotton Yarn.

Benzo Green B B on 100 lbs. cotton yarn.

Prepare dye bath with

1 lb. Benzo Green B B.
(Farbenfabriken of Elberfeld Co., 40 Stone St., New York.)
1 lb. Chrysophenine.
20 lbs. Glauber's Salt.

Enter in yarn at boil, and turn one hour at that heat.

By combining Chrysophenine and Benzo Green B B together, a variety of greens can be obtained. The combination works well, dyeing very level on the fibre. (See recipe 143).

RECIPE NO. 154.

Medium Blue on Woolen Cloth.

Mazarine Blue R N S on 100 lbs. woolen cloth.

Mordant for 1½ hours at boil with

3 lbs. Bichromate of Potash.
2 lbs. Tartar.

Finish with

4 lbs. Mazarine Blue R N S.
(Anchor Color Mfg. Co., 462 Cherry St, New York.)
1½ lbs. Acetic Acid.

Enter in cloth at 140°, bring to boil while turning, and turn 1½ hours at that heat.

Mazarine Blue R N S produces a fine indigo shade of blue, more of a greenish cast than what New Belgium Blue produces. (See recipe 142). It is fast and will not rub off. It dyes perfectly level, going on to the material slowly.

RECIPE NO. 155.

Orange on Cotton Flannel.

Diamine Orange D C on 10 pieces cotton flannel (100 lbs.)

Prepare dye bath with

3 lbs. Diamine Orange D C Patent.
(Wm. J. Matheson & Co., 182 Front St., New York.)
20 lbs. Glauber's Salt.
2 lbs. Soda Crystals.

Enter in cloth and run one hour at boil.

Diamine Orange D C Patent comes in the form of a light brown powder. It is very soluble, and dyes the cloth a full shade of orange. It will combine with other diamine dyes in producing different colors.

RECIPE NO. 156.

Black on Worsted Yarn.

Wool Jet Black 3 B on 100 lbs worsted yarn.

Prepare dye bath with

6 lbs. Wool Jet Black 3 B.
(New York & Boston Dyewood Co., 55 Beekman St., New York.)
4 lbs. Oil of Vitriol.
10 lbs. Glauber's Salt.

Enter in yarn at 140°, bring to boil while turning, and turn to shade at that heat.

Wool Jet Blacks are a new range of blacks brought out by the above firm. They need no addition of any other color to produce a black, the color itself being a full strong aniline. (See recipe 148, this issue, for a black on cotton yarn from Zambesi Black 3 B).

RECIPE NO. 157.

Brown on Cotton Yarn.

Benzo Chrome Brown B on 100 lbs. cotton yarn.

Prepare dye bath with

2 lbs. Benzo Chrome Brown B
(Farbenfabriken of Elberfeld Co., 40 Stone St., New York.)
10 lbs. Common Salt.

Enter in yarn at boil, and turn one hour at that heat. Rinse off and turn ½ hour at boil in a separate bath to which has been added

3 lbs. Bichromate of Potash.
3 lbs. Sulphate of Copper.
½ lb. Acetic Acid.

By treating the Benzo Chrome Browns with Bichromate of Potash and Sulphate of Copper, very fast shades are produced, fast to washing, and when the dyed material has been washed along with white, the color will not bleed on to it. (See recipes 125, 143, and 153 for shades of green from Benzo Green B B).

RECIPE NO. 158.

Black on Cotton Yarn.

Direct Black B on 100 pounds cotton yarn.

Prepare dyebath with

6 lbs. Direct Black B.
(Sykes & Street, 85 Water St., New York.)
25 lbs. Common Salt.

Enter in yarn at 170° F., bring to boil while turning, and turn to shade at that heat. For future colors, use less dyestuff.

Direct Black B is a substantive color, very soluble, and is a strong and fast one. It dyes level on the fibre, and on account of its comparatively low cost, it can be used on mixed cotton and wool goods to advantage, dyeing both fibres alike.

RECIPE NO. 159.

Blue on Worsted Yarn.

Alizarine Lanacyl Blue B B on 100 lbs. worsted yarn.

Prepare dye bath with

2½ lbs. Alizarine Lanacyl Blue B B.
(Wm. J. Matheson & Co., 182 Front St, New York.)

5 lbs. Acetic Acid.
10 lbs. Glauber's Salt.

Enter in yarn at 130°, bring to boil, turn one hour at that heat, then add to bath another

5 lbs. Acetic Acid.

and turn twenty minutes longer. Rinse.

Alizarine Lanacyl Blue B B dyes a bright, full shade of blue, and as the importer has different blues of the same order, the dyer will be able to get any required shade. (See recipe 141, also recipes 110 and 126).

Recipe No. 160.

Black on Cotton Yarn.

Black on 100 pounds cotton yarn.

Prepare dye bath with

5 lbs. Direct Black.

3½ lbs. Oleine.

(Bosson & Lane, 36 Central Wharf, Boston).

10 lbs. Glauber's Salt.

Enter in yarn in a dry state, at boil, turn at that heat 1½ hours, shut off steam, turn ½ hour longer, lift, wash, dry.

Oleine acts as a mordant, as well as a saver of dyestuff, helping the colors to work evenly on the yarn or cloth. (See recipes 29 and 86, blue and brown, respectively).

New Dyes.

We give in this issue a number of recipes containing dyes that have not heretofore been used.

In recipes 146 and 150, we obtain two shades of orange on cotton yarn, from the use of Direct Brown BS, furnished by John J. Keller & Co., New York. This color is fast to light and washing, and the dye is adapted to the coloring of cotton and wool mixed goods, giving perfectly level shades, and as the color produced by it is bright, intense and inexpensive, the article is a thoroughly useful combination dye.

An attractive shade of green on woolen cloth appears in recipe 151, from Anthracene Green EB, obtained from C. Bischoff & Co., New York. This is a new dye, absolutely fast to sunlight, and also to milling, and it can be used as a one-dip color, or as an alizarine color on a chrome bottom, and combines with any alizarine, such as yellow, red, brown, etc.

We have in recipe 155, an attractive color, obtained from Diamine Orange DC, sold by Wm. J. Matheson & Co., New York. The properties of this dye are as follows: fastness to washing, light, acid, and to hot pressing. This dye is not suitable for diazotizing or coupling, though owing to its excellent fastness to washing, it may be used for shading dyeings to be diazotized or coupled. This house sells another brand of Diamine Orange, known as GC.

In recipe 156 will be seen a black on worsted yarn, from Wool Jet Black 3B, procured from the New York & Boston Dyewood Co., New York. This dye, together with 2B was put upon the market last December, and has met with good success for wool. This dye corresponds to other brands sold by this house, known as Wool Black 6B, 4B and 4BF, etc., in all of their properties, but is distinguished by a greater depth and intensity of shade.

We think our readers will be pleased with the shade of Brown on cotton yarn found in recipe 157, obtained from Benzo Chrome Brown B, sold by Farbenfabriken of Elberfeld Co., New York. This particular dye belongs to a series of Benzo Chrome Browns, which have proved themselves very well adapted for the dyeing of mixed goods, as they dye both wool and cotton the same shade. This is a feature to which the especial attention of dyers is directed. Benzo Chrome Brown is the same as Benzo Chrome Black, suitable for the production of direct brown shades, and, on the other hand, if treated with Bichromate of Potash, and Sulphate of Copper, they produce very valuable shades which are said to be superior as regards fastness to washing, soap and light, to those shades which have been produced direct. There is another brand of this dye, known as Benzo Chrome Brown R, which produces a reddish brown shade. The B

brand shown in this recipe is valuable on account of its covering power, which makes it useful for darkening. The combination of the B and G brands give shades which are very similar to cutch brown.

We have in recipe 158 a black on cotton yarn from Direct Black B, procured from Sykes & Street, New York. This dye differs in no essential point from the ordinary direct dyeing colors for cotton, using common salt. It dyes evenly and is as fast as the average direct dyeing colors. We would suggest dyers writing to this house for their sample card, showing the different shades obtained from this dye.

A Correction.

There appeared in recipe 143, September issue, a dye by the name of Benzo Dark Green BB, furnished by Farbenfabriken of Elberfield Co., which should have read Benzo Green BB. This house, however, is just putting upon the market a new color called Benzo Dark Green B, which we hope to show in our Dyers' Supplement in due course of time.

Electrolytic Soda Process.

We have had a number of inquiries concerning bleaching by electricity, and have been asked if there is any process here or abroad which is commercially successful. The best information that we are able to obtain is that there is no practicable process by which bleaching can be attained direct from electricity. Experiments are being made in this direction, but we believe that they have not got beyond the laboratory stage. There are, however, successful processes in operation abroad, as well as in this country, by which bleaching materials are made by electrolysis. One of the principal methods that have come to our attention is the one known as the Hargreaves-Bird process, in which the electrical cell is used. The main advantages claimed for this process are the saving of all expense for fuel for evaporating purposes, as the cells deliver solution of carbonate of soda of such a strength that it will crystallize without any further concentration, and also the even more important circumstances that no waste of the main products is superinduced by secondary reactions.

This is a great advantage remarks the Dyer and Calico Printer, for the taking place of these secondary reactions has been hitherto a very great stumbling block in the way of making soda commercially by electrolysis. Another advantage is gained as a consequence of the direct formation of the carbonate of soda in the cell, and of the doing away with evaporation, namely, a very great saving of plant, and, therefore, of labor and of space.

The above authority also says that the sides of the Hargreaves-Bird cell consist of a remarkable asbestos composition, something like extremely stiff and heavy paper, and made by an exactly similar process to that which is actually employed for paper. They are called diaphragms, and are porous, so that osmosis or liquid diffusion can readily take place through them, on the part, however, of electrically-driven molecules only, so that they are impervious to the electrolyte. They are easily traversed by electrical vibrations. Inside the cell is, of course the electrolyte, strong brine, and in that is immersed the anode. Theoretically this is carbon. Practically it consists of a number of pieces of gas coke threaded so to speak on an iron pipe. In this way the carbon is made to offer a large surface to the electrolyte, and to send out the current into many portions of it at a time. This does away with any necessity for stirring the electrolyte, and hence effects saving in machinery and power, while the decomposing action of the current is at the same time made more rapid. This desirable result is still further helped by the narrowness of the cell, which diminishes its internal resistance. We now arrive at the cathode or negative pole, although not so rapidly as the current does. Here we have the feature of the Hargreaves-Bird cell. The cathode is outside the cell, and it is to this peculiarity that

the arrangement owes its immunity from producing bye-reactions. The electrical forces drive the caustic soda through the diaphragms to the cathode, and once outside the cell it is removed both from the sphere of action of the electrolyte and from that of the chlorine arising from the anode. The cathode is composed of copper wire netting, and one of its functions is to support the diaphragms against the lateral hydrostatic pressure of the brine in the cell.

The Hargreaves-Bird cell is really a double one, for outside the electrolytic cell proper is a chamber which is kept full of steam and carbon dioxide, and the caustic soda, therefore, comes into contact with those gases as fast as it passes through the diaphragms. They then take it in hand, the carbonic acid converting it into carbonate, while the steam condenses and dissolves the sodium carbonate in distilled water, forming a solution of just the right strength, i.e., one which will not block up the steam chamber by prematurely solidifying, but which when collected as it runs out will crystallize spontaneously in a few hours. It is found that the immediate carbonating of the soda effected as we have described still further diminishes secondary action, and thereby increases the proper yield of the cell all round. It goes without saying that the supply of steam, and also that of the carbon dioxide, are carefully regulated to correspond with the output of the cell current in caustic alkali. The chlorine from the anode is collected and taken away by a pipe for any of the numerous uses to which it may be put.

As the action in the electrolytic cell proceeds, fresh brine is pumped into it without any attention being necessary, the delivery of the pump being regulated according to requirements, just as the delivery of steam and carbonic acid to the outer cell is, and the whole series of reactions can be conducted day and night from year's end to year's end without any interruptions, except, of course, partial ones occasionally for repairs, which are necessary sometimes even in the best regulated factories, and always will be.

It is found that 250 cells each with 100 square feet of cathode surface will occupy less than an acre of ground, with the freest allowance for gangways between them. Such a plant would decompose about 2,500 lbs. of salt per hour, and would turn out, making all allowances for unavoidable waste, about 9,000 tons of soda ash and 15,000 tons of bleach (37½ per cent.) per annum. The cost of current would be about $150,000 a year for the 250 cells, reckoning one-half cent per electrical horse-power hour, an estimate which is not exceeded in working on a really large scale. For the same time of one year the value of the output would certainly not be less than $500,000. Experience goes to show that half at least of the difference between this and the purely electrical expenses would be clear profit. The process actually gives 97 or 98 per cent. of the theoretical yield of products derivable from the electrical energy consumed, and, besides that, these products are of exceptional purity. One analysis of the sodium carbonate turned out gave the following figures:

Sodium carbonate	97.7 per cent.
Unconverted sodium chloride	1.02 per cent.
Sulphate and sulphite of sodium.....	1.3 per cent.
	100.02

The presence of the sulphur salts of soda in the sample was no doubt due to the fact that the carbonic acid for carbonating was furnished by the products of combustion from a gas engine.

—The object of developing on textile fabrics the effect known as moire is, as is well known, the production of a peculiar lustre resulting from the divergent reflection of the light rays impinging on the material—a divergence brought about by compressing and flattening the warp and weft threads in places, to a greater or smaller extent, and so producing a flat surface, which reflects the light differently.

QUESTIONS AND ANSWERS.

Under this head we undertake to answer, free of charge, to the best of our ability, any pertinent inquiry pertaining to textile matters received from any regular subscriber to the TEXTILE WORLD. Questions should be stated as briefly and concisely as possible. Inquiries pertaining to textile processes, machinery, improvements, methods of management, the markets, etc., are especially invited, as well as any legitimate discussion on the views expressed. All inquiries must be accompanied by the name of the person inquiring, not for publication, but as an evidence of good faith.

Fustian Manufacture.

Editor Textile World:

Can you furnish us with a book entitled "The Fustian Manufacturer's Manual?
Penn. W. S. C.

The only book we know of which comes near the title given by our correspondent, is "The Complete Guide to Fustian Manufacture," by a practical man, 12mo., 65 pages, published in Manchester, England, price $1.

Plaid Knit Goods.

Editor Textile World:

Can you tell us who manufactures knit fabrics in Scotch plaid, like the enclosed sample, suitable for sewing on to the top of bicycle hose? It is made on either a flat or circular machine.
Mass. L. K.

The sample sent with this inquiry is a plaid knitted fabric in several colors, and is made, we should say on a French circular frame. This frame, we think, is used by some Philadelphia manufacturers. If this should reach the eye of such, we should be pleased to hear from them.

Parson Brownlow.

Editor Textile World:

Do you know of a book written by Parson Brownlow, sometime between 1861 and 1865, giving a history of his life?
Mich. J. L. F.

The book referred to by our correspondent is probably "The Sketches of the Rise, Progress and Decline of Secession," by W. G. Brownlow, published in 1862. This book can be obtained of second hand dealers in books, at a cost of about 50 cents.

Cheviot, Cassimere and Microscope.

Editor Textile World:

Please give me an accurate description of the difference between cassimere and cheviot. Where can I obtain a good microscope to examine cloth with?
Oklahoma. G. B.

The difference between cheviot and cassimere consists more in the finish and weaving of the fabrics than in anything else. The generally accepted definition of a cheviot is a twilled, napped woolen cloth, originally made from the wool of cheviot sheep, but now the goods are made from most any kind of coarse wool that can be spun to the required fineness. This fabric is comparatively loosely woven.

Cassimere is the general term given to a class of woolen goods for men's clothing, and is woven in all styles of weave of which the harness loom is capable. The cassimere is more closely woven, and shrunken more in fulling, and finished with a finer and smoother face than the cheviot. Cassimere is not so open in its texture as cheviot. The difference between cheviot and cassimere can be better understood by specimens of the two fabrics placed side by side.

We would suggest that you write to James W. Queen & Co., Philadelphia, Pa., in regard to a microscope for your purpose. We should say that an expensive instrument would not be required simply for the examination of cloth.

The Tuttle Knitting Machine.

Editor Textile World:

I am anxious to know where I can obtain a Tuttle knitting machine. I want it for knitting stockings.
New York. A. B.

The parties manufacturing this machine are the Lamb Manufacturing Co., Chicopee Falls, Mass.

Mail Harness.

Editor Textile World:

Will you please inform me whether a mail harness can be used economically on ordinarily heavy twill goods, say 48 to 64 ends per inch, 6s to 12s yarn.
Tenn. G. N. C.

We think that a mail harness can be used to good advantage on heavy twill goods, 48 to 64 ends per inch. We post our correspondent a sample of a mail harness, suitable for the work named by him, and such as are used in mills on similar fabrics.

Bleaching by Electrolysis.

Editor Textile World:

Can you inform me if there are any concerns in Europe or the United States that are using a system of bleaching by electrolysis?
Canada. A. E. F.

There are several systems of preparing bleaching materials by electrolytic processes that are in successful operation in this country and abroad. We will mention the following: Le Sueur, Castner-Kellner, Baker, Hargraves and Bird. Electricity, in itself, does no bleaching, but it used for the purpose of preparing bleaching agents, or exciting the bleaching process.

Book on Wool Carding.

Editor Textile World:

Will you kindly recommend me to a good book on wool carding?

Michigan. K. K. C.

There is no up-to-date book on this subject, conforming to American practice. The best work relating to this subject is an English one on Wool Spinning, by Chas. Vickermann. This is a most excellent work for students in textile schools, and for skillful practical men in woolen mills. It takes up the principles that underlie the various operations of the earlier part of manufacture, from wool sorting to spinning, inclusive.

The Industrial Commission.

Editor Textile World:

What is the object of the Industrial Commission which has just been appointed by the president of the United States?

New York. J. M. F.

The duties of the commission referred to are to investigate questions pertaining to immigration, labor, agriculture, manufacturing and business, and to report to Congress suggesting such legislation as it may deem best upon these subjects. It is expected that the commission will furnish information and suggest legal enactments as a basis for uniform legislation by the various States of the Union, in order to harmonize conflicting interests and to be equitable to the laborer, employer, producer and consumer. The commission is composed of five members of the Senate, five members of the House of Representatives, and nine other persons, fairly representing the different industries and employments, the latter having been appointed by the president. S. N. D. North, the able secretary of the National Association of Wool Manufacturers, is a member of the commission, and is put there to represent the textile industry. This is one of the most satisfactory appointments that have been made by the president.

History of Cotton Manufacture.

Editor Textile World:

Kindly advise me at what price I can obtain "The History of Cotton Manufacture," by Edward Baine.

F. A.

This book can be obtained only of dealers in second-hand books. We can secure a well preserved copy at $1.75.

Azo Colors.

Editor Textile World:

Can you briefly tell me what is meant by Azo colors?

Mass. T. C. A.

The best that we can do to give our correspondent an idea of what he desires to know is to refer him to the Dictionary of Coal-Tar Colors, compiled by George H. Hurst. We think that he will be able to find it in the library where he is located. He will find it there stated, that Azo colors belong to a large and important group of coloring matters, comprising many of the most useful and fastest dyes at the service of the textile colorist. The characteristic feature of the azo coloring matters is that they contain one or more groups of two nitrogen atoms, connected by two affinities, leaving an affinity to each nitrogen atom, to be combined with other radicals.

Cotton Cloth Wanted.

Editor Textile World:

Can you oblige me by letting me know where I can buy 64 by 64 cotton goods in gray, and also sateens in gray, etc.

Canada. P. B. C.

We have sent a reply by mail.

Honeycomb and Huck Cloth.

Editor Textile World:

I saw reference in some of the trade papers that I take, to honeycomb cloth and huck cloth. Will you please tell me the difference, or how these names are applied to fabrics?

New Hampshire. J. T.

Honeycomb cloth refers to a style of fabric in which the threads are interlaced so as to form squares, the centres of which are lower than the ridges which form the sides. Huck cloth is a fabric used for towelings. The style of weave which is used for it is of a character which will give firmness and some roughness to the surface.

Count of Yarn.

Editor Textile World:

It may seem strange to you that I should ask the question, what is the count of yarn which weighs 25 grains for a length of 120 yards, but I should like to know. I am a learner.

Conn. M. P. A.

The count of yarn is 40, which is obtained by dividing 1,000 grains by 25. This is based upon the theory that 840 yards of No. 1 yarn weighs one pound, or 7,000 grains. As 120 yards is 1/7 of 840, this

length would weigh 1,000 grains for this number of yarn. We send by mail a leaflet that gives detailed particulars of how to ascertain counts, etc.

Artificial Silk.

Editor Textile World:

Can you give me some information relating to the subject of artificial silk made from cellulose, etc.? The account given in the last publication on the subject of fibres, by C. R. Dodge, Department of Agriculture, Washington, D. C., is not sufficiently full for my purpose. I understand that Mr. Dodge based his notes on an article that appeared in the Textile World in 1897. The main point of interest is to know where this artificial silk goes. To what extent is it used in mixing with true silk, and in what classes of goods?

Va. F. C. K.

We would suggest to our correspondent that he secure a copy of the June, 1897, issue of the Textile World, which will give him fairly complete information upon this subject. There is nothing being done, so far as we know, in this country, in the manufacture of artificial silk, either as a fibre, or as fabrics. We are inclined to think that it has not proved so successful as was anticipated by the inventors and those contributing money to its exploitation. In the early part of 1897, a number of men of means became interested in it, and attempted a scheme of organization for a company with a share capital of five million dollars, to control the American patents and rights of Count Hillare de Chardonnet's process, and all of its improvements. S. V. White, of New York; F. C. Sayles, of Pawtucket, R. I., and W. B. Plunkett, of Adams, Mass., were interested in the project. The patents were valued at $250,000 and a manufacturing plant was to be erected at a cost of $150,000. We have been informed, but we have failed to obtain confirmation of it, that factories have been established at Besancon, France, and Sprietenbach, Switz., besides one or two other Continental locations, and a factory for its manufacture was erected at Brandon, near Coventry, England. It has not yet taken the place of silk.

Blake Pump.

Editor Textile World:

I would like to know the rule for setting the steam valve of a Blake single steam pump, also what claim the builders make for the auxiliary valve.

Randolph, Mass. F. W. S.

A single piston steam pump must be positive in its action and the operation at the slowest speed, throughout the entire range of pressure for which the pump is designed, must be perfectly continuous.

The main or pump piston could not be made to work slowly, were the main valve to derive its motion solely from this piston, for when this valve had reached the centre of its stroke, the ports leading to the main cylinder would be closed, there would be no steam entering to act on the said piston, and consequently the pump would stop as its momentum would not be sufficient to carry it over the centre.

To shift this valve from its central position some independent agent is required, which in the Blake pump is the supplemental or valve driving piston.

The main valve which controls the admission and exhaust of steam to and from the main cylinder is divided into two sections, the lower one which slides on a seat on the main cylinder has three ports and is practically an extension of the ports or a moveable seat, and is operated by the valve stem, at the same time it affords a seat for the main valve proper which slides upon its upper face. The upper section or main valve proper derives its motion from the supplemental piston.

When the main piston has nearly reached the end of its stroke the valve motion moves the lower section of the main valve, this movement though slight, uncovers small steam ports and opens the opposite exhaust ports to the supplemental piston which quickly makes a stroke, moving the main valve admitting steam to the other side of the main piston.

The main piston cannot strike the heads of its cylinder as the main valve has a lead or in other words, steam is always admitted in front of main piston before it reaches the end of the cylinder, even should the supplemental piston be tardy in its action, for the lower section would be moved far enough to open the steam port, since the travel of the lower section is greater than that of the upper or main valve proper. In setting this valve it is only necessary that the nuts on the valve stem are adjusted so as to give the longest stroke possible and accomplish the reversal. The striking points of the piston may be marked on the rod and the nuts set so as to engage the shifting or tapped arm when the piston has completed about ⅞ of its stroke.

The supplemental piston cannot strike the heads of its cylinder for in its alternate passage beyond its exhaust ports, it cushions on the vapor thus entrapped.

—Massachusetts, Easthampton. The Williston Seminary has foreclosed its mortgage on Easthampton Spinning Co's mill, which has not been operated for over a year. It is not thought that this action will change the situation so far as the starting up of the plant is concerned.

New Publications.

Dye Topics. We have received from Hanna-Schoellkopf Co., 135 North Water St., Philadelphia, the first number of the new monthly publication which they will issue and in which dyeings will be shown illustrating their colors. Besides this, there are other matters of interest for the dyer. The Hanna-Schoellkopf laboratory is prepared to make tests, analyses, etc. for the trade. They announce that any dyer wishing to receive Dye Topics regularly should send his name and dye house to the firm.

The Manufacturers' Gazette, which for many years was published in Boston and more recently in Providence, has been consolidated with Textile America of New York, and will go under the name of Textile America and Manufacturers' Gazette, being issued monthly. The New England office will be maintained in Boston with J. A. Chaffee as representative. Mr. Chaffee has lately been the editor of the Manufacturers' Gazette. Max Jagerhuber continues as president and manager of the combined publications.

The Mill and Shop Journal and the Southern Industrial News have been consolidated under the name of Mill & Shop News. Publication office will be in Charlotte, N. C., where the Southern Industrial News has been published, and the Northern representation will be in the hands of T. O. Dowd, the publisher of the Mill and Shop Journal. Mr. Dowd is one of the oldest advertising representatives in the textile field and has many friends in the trade. Prospectus states that the publication will hereafter be issued semi-monthly.

Political Science Quarterly, for September, 1898, has just been issued from the press of Ginn & Co., 9 Tremont Place, Boston. This quarterly is edited by the faculty of Political Science of Columbia University. This number contains some remarkably scholarly articles, upon the following subjects: Slavery in Early Texas; The Living Wage Movement; Direct and Indirect Taxes; Movements of Prices; Qualifications for the Suffrage; Twentieth Century Democracy.

Appleton's Popular Science Monthly, for October. New York: D. Appleton & Co. $5 a year. The October issue of this popular magazine has a number of articles of true interest to our readers. Among them may be especially noticed one by Edward Atkinson, on the "Evolution of High Wages from Low Cost of Labor." Mr. Atkinson points out that in every branch of industry there has been a progressive advance in the rate of wages, and that this advance has been accompanied by, and is in fact a consequence of a general decline in the prices of nearly all products. A most timely article also appears, from Prof. W. Z. Ripley, on "Russia and the Slaves." This will be read with much interest, due to the rapid growth of Russian civilization, and the prominent position which that country has assumed among modern nations. Among the other articles may be mentioned "Plant Life in the Canaries;" "Weather Freaks of the West Indies;" and the continuance of the series on "Evolution of Colonies," by James Collier.

Worsted Machinery. This is the title of a catalogue of worsted machinery issued by the Lowell Machine Shop, Lowell, Mass., which has just entered upon its manufacture, that gives promise of being a permanent success on a scale of much greater magnitude than ever before attempted in this country. The catalogue is fully illustrated of worsted, spinning and drawing machinery, designed after the patterns of the worsted machinery of Prince, Smith & Sons, England. Parties interested in this class of machinery or contemplating its purchase should procure a copy of this catalogue.

The State. By Woodrow Wilson, Boston: D. C. Heath & Co. Price $2. This is a revised edition of the most popular and best written work that we know of on the elements of historical and practical politics. The author is the professor of Jurisprudence and Politics at Princeton University. As a work from which the student and the ordinary reader can get a clear conception of the systems of government of the several nations of the world, and of general institutional history, we know of none that can be compared to it as an equal. The author has met with excellent success in his efforts to embody the result of constitutional and legislative changes which have taken place since the appearance of the original edition in 1889. The book presents a comparative but not controversial, description of the principles and machinery of legislation and administration under the chief modern governments. The author has had access to the best and latest authorities, and has been able to give the whole matter of the book its proper historical setting. A Japanese edition, published in Japan, has been put upon the market. Cambridge University, England, has for some years used "The State" as a standard text-book. About two hundred American colleges use it in their courses, and it is found in almost every library of importance.

American Correspondence School of Textiles. Lowell, Mass., has just issued a catalogue relating to its system of instruction. The fact that C. P. Brooks is director and instructor of this school entitles it to the support and favorable consideration of those intending to pursue studies in textile lines. A catalogue will be sent upon application to the director of the school, and we would suggest our readers securing a copy, as it will be found to contain much interesting matter relating to textile education, that may be of specific value. In this school, an opportunity is given all mill workers, from the superintendent to the yarn boy, and to all associated with the manufacture, distribution, or handling of textiles and textile fabrics, to obtain a satisfactory textile education. Teaching by correspondence is not a novelty, as it is pursued in schools of engineering, of law, of journalism, etc. The school is divided into five departments, given to cotton manufacture, fabric designing, woolen manufacture, worsted manufacture, and bleaching, dyeing and printing.

Goldman's Arithmachinist. This is the title of a small book of 160 pages, published by Henry Goldman, Chicago, Ill., who is the author and inventor of several systems of book-keeping, with special reference to taking off trial balances, computing interest and discount, averaging accounts, etc. The Arithmachinist is intended as a practical self instructor in mechanical arithmetic, and to popularize the adoption of machine methods in practical accounting. In order to further this end, Mr. Goldman offers his arithmachine that is claimed to be rapid and reliable in computations, low in price, answering the popular demand.

Bulletin of the National Association of Wool Manufacturers, for September, 1898. Edited by S. N. D. North, secretary. Published by the association, Boston, Mass. This number of the bulletin reaches us with much valuable matter relating to the woolen industry. Secretary North has contributed some scholarly articles relating to the economic status of American industries, and to the future of protection. Price $2 per year.

Anthracene Acid Colors. This is the title of a small sheet of color shades issued by William J. Matheson & Co., New York. The color here described is dyed in one bath, fast to milling. We would suggest dyers writing to this house for this color sheet.

Industrial News.

—M. A. Furbush, 224 Market St., Philadelphia, Pa., is offering for sale or to rent, a three-story brick building, 4054 Haverford Ave., Philadelphia, which is suitable for knitting or other light manufacturing. Building is 27 by 86 and light on all four sides, and is provided with piping, shafting, etc., and is in the best of repair.

—Prof. F. W. Chandler, of the Massachusetts Institute of Technology, has accepted the invitation of the Executive Committee of the Massachusetts Charitable Mechanic Association, Boston, and will serve on the board of judges of the Shattuck prize competition of designs for artisans' homes in conjunction with Prof. H. Langford Warren, of Harvard, and J. M. Carrere, of New York.

—The new inserted-wall cylinders for shirt machines and rib border machines as built by Scott & Williams are proving a decided success. The Oneita Knitting Mills of Utica, N. Y. are using an 18-inch 8 feed machine and are well pleased with the fabric produced. The Harrisburg Knitting Mills have recently added eight of the Scott & Williams seven-eighths automatic seamless machines to their plant. The Cleremont Mills of New Berne, N. C., have recently purchased twenty of the Scott & Williams seven-eighths automatic seamless hosiery machines.

—The Tuscaloosa Wadding Company, Tuscaloosa, Alabama, of which E. B. Nuzum is president; F. A. Brady, secretary and treasurer, and D. J. Griffin, manager, are rapidly completing their new mills and expect to be able to start by the middle of next month. Their equipment throughout is first class in every particular, and among other machinery installed is a Cyclone automatic cotton stock dryer, with self feed, purchased from the Philadelphia Textile Machinery Company.

—A very handy and comprehensive Guide to Boston has just been published by the Mechanics' Fair Committee and is being eagerly sought by intending visitors to the Exhibition, as well as by others who contemplate a trip to the metropolis. The book is up-to-date, with readable descriptions of Boston's most notable points and objects of interest, and will be found very handy for reference.

—The big building of the Massachusetts Charitable Mechanic Association on Huntington Avenue, Boston, is rapidly being prepared for the exhibition which will open October 10th and which will undoubtedly prove the most important and interesting ever given by this organization.

—The committee has decided that anyone sending a two-cent stamp to Henry D. Dupee, secretary, Mechanics' Building, Boston, will receive by return mail a copy of this valuable little guide-book free of charge.

—The Dixon Crucible Company, of Jersey City, N. J., has published a little pamphlet "Help in Brazing." It treats incidentally of brazing graphite, the application of which to bicycle tubes prevents the adherence of the spelter and so effects a saving in labor by making unnecessary the filing which is otherwise needful. The pamphlet, however, especially treats of the process of brazing by the dipping method, or "liquid brazing," as it is called. The brazing crucible is described, together with instruction and caution in regard to its use. Instructions are given how to build and set the necessary furnace, time required for brazing, etc., etc.

—A semi-annual dividend of four per cent. was declared last Saturday by the Henderson (N. C.) Cotton Mills Co. The mill has been in operation only between two and three years, and has paid so far, an average of over eight per cent. in dividends, and expects to do still better during the next six months, its officials state.

—The Lancaster (S. C.) Cotton Mills has just paid the three per cent. semi-annual dividend declared July 1, for the first six months of 1898. Its 500 looms and 10,000 spindles are running on full time, and the prospects of a larger dividend January 1, are said to be encouraging.

—The Krout & Fite Mfg. Co., Philadelphia, manufacturers of silk and narrow fabrics, etc., have removed from 2632-40 Mascher St., to Allegheny Ave. and Emerald St., where they will have very largely increased facilities for attending to the wants of their customers. Their new mill is 200 by 42 feet, three stories high, with engine house and boiler room separate, also a separate wing for their office. In their present location they are prepared to make any new line of goods, comprising narrow fabrics, etc., and solicit the patronage of all who desire spool tapes for underwear, besides braids in silk and cotton, and satin ribbons.

—H. L. Webster, for a time Philadelphia agent for the Holbrook Mfg. Co., has resigned his position to engage in the dyeing and finishing business, and R. D. Kirkland has again taken the Philadelphia agency, with office at 439 Bourse Building.

—The Berlin Iron Bridge Co., East Berlin, Conn., have the contract for furnishing the steel work for the Memorial Hall, being erected at Waverley, R. I. This building is to be fire proof throughout, with steel floor beams and columns supporting the floor structure, extra trusses and beams for the roof. A building about 60 feet square is being erected for boiler purposes, by C. N. Robertson, of Montville, Conn., fire proof in its construction, having a framework of steel, which is being furnished by the Berlin Iron Bridge Co. This company has also received the contract for furnishing several bridges and buildings on the line of the Meriden & Compounce Electric Railroad Co., Conn. This company is also supplying the entire steel framework of the building now being erected by Beaman & Smith, Providence, R. I., for a machine shop, 60 feet by 130.

—"The Little Hustler" fleecing machine for cotton and woolen goods, made by the Little Hustler Napper Co., Hudson, N. Y.,

is receiving considerable attention from manufacturers. Robert Stairs, superintendent of the Portsmouth Knitting Co., of Virginia, recently visited the Athens Knitting Company's mill, and saw this napping machine working, and was so pleased with what it was accomplishing that he gave an order at once for a machine. We are also informed that Robert McKinnon has replaced his old napping machines with the "Little Hustler." The following mills are among a number of those using this fleecing machine: The Portsmouth Mills, Portsmouth, Va.; Powhatan Mfg. Co., Norfolk, Va.; The Swits Conde Co., Oswego, N. Y.; Robert McKinnon, Little Falls, N. Y.; Harder Knitting Co., Hudson, N. Y.; Clinton Knitting Co., Syracuse, N. Y.; Kendall Knitting Co., Utica, N. Y.

What to See in the Mountains.

That the mountain ranges of northern New Hampshire are famous is evidenced by the thousands of visitors who annually seek the section for a season of recreation and rest. It matters not to what portion of the mountain region you go, for you will never be dissatisfied, as the variety and extent of scenic attractions is unlimited and your expectations, no matter how ambitious, are more than fulfilled.

Several hundred square miles of mountain peaks comprise the White Mountain region, and of the scores of resorts located in its midst, space permits mention of but a few of the largest.

Many consider the vicinity of Dixville Notch the most beautiful part of the White Hills. The view of the surrounding territory is very beautiful, for lakes, mountains, brooks and ravines are everywhere around, making an interesting landscape. In the Franconia region one finds many odd though beautiful attractions. There the Old Man of the Mountain stands guard over a galaxy of wild though particularly impressive bits of nature work. There is Cannon Mountain and Eagle Cliffs and Mt. Lafayette and Agassiz and Cleveland, while a short way off is Cherry mountain, The Twins, and the Presidential Range, while natural curiosities like The Basin, The Flume, The Pool, and Echo Lake and Profile Lake are well worth visiting. Then, of course, all who go to the Mountains want to visit the Wonderland of New England, as that famous mountain pass, Crawford's Notch, is termed. Everything there is in its primeval state, and charming cascades, rushing forest streams and gigantic mountains make it the ideal place for the tourist, as well as the one seeking rest.

Fabyans, in the very heart of the mountains, with Mt. Pleasant and Twin hard by, is in a region replete in alluring features, and one needs but a visit there to make him a mountain enthusiast. Mt. Washington is the highest of any of the White Mountains and its summit is reached by a railroad. The journey occupies nearly two hours, and there is not a moment but what is interesting and the outlook is something grand. Jefferson is a pretty place, and the same can also be said of Whitefield and Lancaster. Bethlehem and Maplewood have many leading characteristics, but perhaps the most famous of them all is its renowned atmosphere, which is particularly helpful to hay fever sufferers. Besides its glorious sunsets, Sugar Hill has from its location an unobstructed view extending from Mount Washington on one side to Camel's Hump on Lake Champlain, and the mountains that border the Canadian shore of Memphremagog. North Conway and Intervale and Bartlett and Glen and North Woodstock are equally attractive as pleasure resorts, and at any of them you will find excellent accommodations, for the mountain hotels are every one of them models.

The Boston & Maine Railroad place on sale at many of its leading stations reduced rate tickets to all points in the Mountains. The choice of several routes will be allowed, and for information apply to any station ticket office. Send to the General Passenger Department, Boston & Maine Railroad, Boston, for the book "What to See in the White Mountains."

Clemson College Textile School.

The machine builders, with their customary liberality, have contributed generously to the textile department of Clemson College. The equipment and the list of donors are as follows:

Mason Machine Works, Taunton, Mass.—One revolving flat card, one drawing frame, one spinning frame, one plain loom, one drop box loom.

Saco & Pettee Machine Shops, Biddeford, Me.—One revolving flat card, one drawing frame, one railway head, one slubber, one roving frame, one spinning frame, one spooler.

The Draper Company, Hopedale, Mass.—Two Northrop looms, one beam warper, one spooler, one twister, spindles, separators, lever screws, saddles, templers, as required.

The D. A. Tompkins Company, Charlotte, N. C.—One combination yarn reel, one band machine, one warper beam, one doffer box, one loom box, one electric switch board, one drawing-in frame.

The A. T. Atherton Machine Company, Pawtucket, R. I.—One combination breaker and finisher lapper, with self-feeder attached.

Westinghouse Electric and Manufacturing Company, Pittsburg, Pa.—One 30 h. p. electric motor.

Jones & Laughlin, Pittsburg, Pa.—All shaftings, hangers, pulleys, couplings, etc.

Metallic Drawing Roll Company, Indian Orchard, Mass.—Metallic drawing rolls as required.

The instructor for textile work had not, at the time of writing, been chosen, but will probably be decided upon very shortly.

It is expected that in the near future, additional equipment will be installed, so that instruction in practical mill dyeing and chemistry can be given.

—We are in receipt of two attractive pamphlets issued by the B. F. Sturtevant Co., Boston, Mass., on the Sturtevant patent "Steam Hot Blast Apparatus" and "Draft Without a Chimney," both illustrated, and although having advertising features, they can be readily taken as entirely out of the advertising realm as furnishing valuable information on the topics treated upon. The first mentioned pamphlet contains the essence of much that is essential to a knowledge of the construction and advantages of the hot blast apparatus referred to. There are many advantages connected with this system of heating and ventilating which are superior to direct heating, among which may be mentioned greater centralization, no steam piping scattered around the building, no danger of freezing, or damage from leaky joints, besides furnishing ample and positive ventilation and regulation of humidity, etc. The pamphlet on "Draft Without a Chimney" refers to a subject that has already been treated in our columns, which attracted the attention of mill owners at the time

of publication. These pamphlets are what manufacturers should carefully read, and we would suggest their writing for them to the company that issues them.

The Stempel Fire Extinguisher.

There appears in our advertising columns, on page 17, a reference to the Stempel fire extinguisher that is deserving of attention from manufacturers and those in need of such apparatus. The bare reference to such concerns as the Pennsylvania Railroad, John Wannamaker, Girard College and Academy of the Fine Arts of Philadelphia should be of sufficient commendation to anyone concerning its value. It is warmly endorsed by the Boards of Fire Underwriters of Cincinnati, St. Louis, Nashville, Baltimore, Philadelphia, Cleveland, Rochester and other places. It is spoken of by those who have practically tested its qualities as an apparatus of great certainty, quickness and power of action. It has no valves or mechanism whatever to get out of order. The chemical used in it remains unaffected by time or natural effects and will be just as efficient ten years hence as now. There is nothing about it to get out of order and its work is purely automatic.

Removal of Steam from Slashers.

The prevention of steam or its removal from slashers and slasher rooms occupies the attention of all who have slashers in operation. Of late the old time method of hoods and natural ventilation is rapidly giving way to more positive means and the exhaust fan is proving an efficient substitute. The subject is well treated in an attractive and interesting catalogue (designated as No. 105) which has just been issued by the B. F. Sturtevant Co., of Boston, Mass. In it are shown various types of fans, blast gates and ventilators, together with elaborate tables of exhaust fan dimensions. Views are also presented of the Sturtevant improved system of removing steam from slashers as actually applied in various mills. These views proclaim the facility with which such applications can be made to either old or new machines of any type. There is also presented a list of slasher plants equipped with Sturtevant fans. The catalogue will prove of interest to any one who has to do with slashers.

A New Over-Seaming and Hemming Machine for Knit Goods.

There is a new seaming machine put on the market by Arthur Mueller of 754-760 Lexington Avenue, Brooklyn, N. Y., for which an United States patent has been applied for. This new machine will soon be in use in the knitting mills of this country. Its high speed, beauty of seam, and elegance and superiority of construction, are among its claimed merits. The machine is guaranteed to run at a speed of over 3000 stitches per minute, for seaming all kinds of selvage-edged knit goods, making a very flat elastic double-thread lock-stitch. The machine will also over-seam cut edges, and join cut and selvage edges at one operation. The machine is regarded of special value for seaming sweaters, as the sides and sleeves can be seamed on the machine at the same time. It is considered of great value for seaming up the full-fashioned stockings as made on the Cotton's Patent Flat Frames. By means of a small hemming attachment the machine will sew a hem or welt on stockings or underwear (cut edge as well as selvage edge), at the same high speed of 3000 stitches per minute.

Recent Sales of Mill Shares.

	Lowest.	Highest.
Amoskeag	1362½	1362½
Assabet	69½	70½
Hamilton (Cotton)	622½	622½
Lancaster	312½	312½
Manchester	98¼	98¼
Merrimack	900	910
Middlesex	120	120
Barnard	70	70
Granite	70	80
Sagamore	85	85
Weetamoe	40	40
Naumkeag	49	49
Massachusetts (Ga.)	108	108
Bates	102¼	102¼
Chace	90	90
Stafford	95	95
Border City	110	110
Mechanics	65	65
Lyman	51½	52½
Appleton	100¼	100¼
Continental	15	15
Laconia	550	550
Franklin	98¼	98¼
Flint	90	90

—Massachusetts, Worcester. The Lakeside Mill, whose water power was taken by the city of Worcester, is being stripped of machinery and will be abandoned as a woolen plant. It contained 2 sets, 28 looms and was operated on satinets, but has not been running for several years. Most of the machinery is being moved to the Chapel Mills at Cherry Valley.

—New Hampshire, Guild. It is reported that the Granite State Mills have been purchased by Daniel Tilton and Michael Duffey of Franklin Falls, New Hampshire.

—*New York, Little Falls. The Saxony knitting mills, which have been shut down for the past three months and were recently sold at auction, are running for a few days to complete the stock on hand. It is expected that the plant will be put in operation by Nov. 1st, or else removed to some other place.

—New York, New Orange. It is reported that the Reliable Silk Mills, of which W. H. Wiley is proprietor, are to remove to this place and a new building for them will be erected at once.

—New York, Perry. It is now expected that the Perry Knitting Mills will be removed to Jamestown, N. Y., which place has offered a bonus.

—*New York, Perry. There have been numerous reports that the Perry Knitting Co. was to be removed to Jamestown, N. Y., which latter place was to pay a large bonus. Mr. G. M. Traber, manager of the company, informs us that this report is erroneous and that the plant will remain where it is.

—New York, Rexleigh. It is reported that George Brockway of the Marble Knitting Works is considering a removal of his plant to Cohoes, from which city he move to this place several years ago.

MILL NEWS.

Cotton.

New Mills.

—Alabama, Alabama City. Concerning the report that the Dwight Mfg. Co. will build a new mill, we are officially informed that they are contemplating erecting a plant somewhat smaller than their present plant at this place which contains 27,000 spindles and about 800 looms. The mills manufacture goods principally for export. The dimensions of the building have not yet been decided upon and ground has not yet been broken as has been reported elsewhere. A new mill is practically decided upon, although the details are not yet definitely determined.

—*Georgia, Columbus. F. B. Gordon, secretary of the committee in charge of raising capital stock for the new Columbus Mfg. Co., reports that he is meeting with very good success, and the prospects for the enterprise are quite favorable.

—*Georgia, Rossville. The movement which was reported several months ago for the establishment of a new cotton mill has lead to the formation of a company, in which W. A. Campbell of the Park Woolen Mills, W. F. Hutchison and E. G. Richmond of the Richmond Hosiery Mills are interested. The idea is to build a yarn mill which will supply warps for the Park Woolen Mill and yarn for the hosiery mills. Plans have been prepared and it is understood that work will go forward without delay. The plant will ultimately have a capacity of 25,000 spindles, but will probably be started with a less number.

—*Georgia, Rossville. Concerning the new yarn mill reported for this place, W. A. Campbell, one of those interested, advises us that no definite plans have yet been developed and no organization effected, and he cannot say positively whether the project will materialize or not.

—*Georgia, Whitehall. Concerning the new cotton mill at this place we learn that it will be known as the Whitehall Yarn Mill, John R. White, proprietor. It will have no connection with the Georgia Mfg. Co., of which Mr. White is president. It is expected that production will begin about Jan. 1st. Yarn from 10's to 20's, single and double on cones and skeins will be made; 2500 spindles; steam power.

—*North Carolina, Albermarle. The new building of the Wiscassett Cotton Mills will soon be ready for machinery.

—*North Carolina, Chapel Hill. Work has been begun on the new cotton mill at this place, in which T. F. Lloyd is largely interested.

—*North Carolina, Chapel Hill. We have further official information concerning the Thomas F. Lloyd Cotton Mills. There is no company. It will be a spinning mill with 5,000 spindle capacity, and will manufacture yarns of about 30s average on warps, cones, tubes or hanks, employing about 75 hands. Foundations were started Sept. 15th and the production of yarn will probably begin about the first of April. None of the machinery has yet been ordered and correspondence concerning machinery and equipment, including steam plant, will be considered.

—*North Carolina, Cherryville. The cotton spinning mill to be established by Rudisill & Adelholdt will be equipped at the start with 1,000 spindles, on which coarse numbers, 8's to 20's will be spun. This is said to be second-hand machinery in excellent condition. It is hoped within a year to put in 1,000 or more spindles. The mill will accommodate about 3,000 spindles.

—*South Carolina, Bennettsville. Col. C. S. McColl, who was mentioned as the president of the new spinning mill projected at this place, informs us that the company has not been formally organized yet. They hope the $100,000 capital stock will be subscribed and the projectors are making every effort to bring this about.

—*South Carolina, Fountain Inn. The building for the Fountain Inn Mfg. Co. has been completed and equipment will now be put in soon. This will consist of 2500 or 3000 spindles. The mill was designed to accomodate about double this capacity, and the balance will be added later.

—*South Carolina, Lando. B. H. Heath of Charlotte, N. C., principal owner of the Manetta Mills, which were burned recently announces that he will rebuild same immediately, but it will be equipped for hosiery yarns.

—*Tennessee, Chattanooga. Concerning Vance & Kirby Mfg. Co.'s mill, we now learn that it is largely dependent upon $15,000 being raised in Chattanooga. Vance & Kirby have mill building which they will contribute, and if the money can be raised locally, it is understood that out of town parties will contribute enough more to equip a 5,000 spindle plant.

—*Texas, Corsicana. We understand that O. S. Causey, superintendent of the Palmetto cotton mills, Palmetto, Ga., has taken $10,000 stock in the new company to build a mill here, in which S. W. Bogy is interested. This mill will have both spinning and weaving machinery and it is hoped that stock to the amount of $100,000 will soon be subscribed, so that building may be started early in the fall.

—*Texas, Waco. We learn that the name of the new company which is being organized to build a cotton mill will be McLennan County Cotton Mill. The matter is receiving the attention of the citizens and it is hoped that it may materialize. The present idea is to start a mill of about 5,000 spindles with looms, to be operated by steam power. F. W. Burger, James B. Blake, J. W. Taylor and others are interested. Capital will probably be $150,000. Information regarding plans and equipment is desired.

Enlargements and Improvements.

—*Georgia, Columbus. E. N. Clemence, treasurer, Eagle & Phoenix mills, informs us that expenditure of $50,000 authorized by the board of directors will provide for new looms and new cotton ware-house, addition to the present machine shop, also addition to the picker room and machinery for the picker room, re-arrangement of the fire protection apparatus, and general repairs to the various buildings of the plant. This expenditure will not increase the number of spindles or operatives at the mills.

—*Georgia, Dalton. The new mill of the Crown Cotton Mills will soon be ready for machinery, which will consist of 10,000 spindles and 250 looms.

—*Georgia, Whitehall. Work has been begun on the new mill at this place for the Georgia Mfg. Co., John R. White, pres. It will contain 2500 spindles, and will manufacture yarns from 10s to 20s. We understand that orders for most of the equipment have been placed and it is expected that the addition will be in operation early in the coming year. Total capacity of the plant will now be about 14,000 spindles.

—*Mississippi, Stonewall. In August we reported that the Stonewall Cotton Mills were considering an enlargement of 5,000 splindles. This addition, with corresponding equipment, will probably not be made until next year.

—*North Carolina, Burlington. The Aurora cotton mills are putting in a new 800 h. p. engine, having taken out the 250 h. p. machine. We recently reported that this mill was to add 150 new looms.

—North Carolina, Cherryville. The Cherryville Mills have recently installed considerable new machinery, including about 1500 spindles, revolving flat cards, spoolers, etc. At the recent annual meeting all the directors were re-elected.

—*North Carolina, Concord. We hear from the Buffalo Thread Mill that their addition to the main building will not include any new machinery.

—North Carolina, Henderson. A new duplicate building is to be built by the Henderson, N. C. Cotton Mill (separate and distinct from recent improvements) before the end of the present year, it is stated by a stockholder. This will bring the total capacity, after the addition is equipped, up to 12,000 spindles. The new building will be two stories high, of brick and 80x72 feet.

—*North Carolina, Taylorville. J. H. Moore confirms the report that he will double the capacity of his plant giving him, when completed, a mill with 1664 spindles and 50 looms. He makes 3 yd. brown sheetings, and uses water power.

—*South Carolina, Columbia. The Grandy cotton mills have been granted permission to increase capital from $200,000 to $800,000. This will provide for large increase in equipment mentioned last month as giving the mills 50,000 spindles.

Mills Starting Up.

—Connecticut, Moodus. The New York Net & Twine Co., which has been shut down since the 10th of May, has started up on full time.

—Connecticut, Moosup. The cotton yarn mill of Floyd Cranska has started up on full time.

—Massachusetts, Lawrence. The Everett Mills have started up after a few weeks' shutdown.

—New Hampshire, Claremont. The Monadnock Mills have started up and are now running in full. They have been closed since Aug. 13th.

—New Hampshire, Manchester. The Manchester mills, which have been running 2200 looms alternate weeks since last April, will now run on full time with the exception of 750 looms, which will be stopped permanently.

—New Brunswick, Milltown. The St. Croix cotton mill at this place, started up Sept. 5th.

—New Hampshire, Somersworth. The Great Falls Bleachery, which shut down Aug. 27th, started up Sept. 5th.

—New York, Stuyvesant Falls. The Van Alen Cotton Mills, Chas. Frisbee manager, are getting ready to start up after having been shut down for nearly five months.

—New York, Wappinger's Falls. The Dutchess County Print Works are constantly increasing the amount of work in hand, and it is expected that in a short time will be running their full capacity.

—North Carolina, Rutherfordton. It is expected that the Rutherfordton cotton mill, recently purchased by Myer Levi and associates, will probably soon be put in operation. It is now understood that equipment will be 2,500 to 3,000 spindles.

Mills Shutting Down.

—Maine, Springvale. The Springvale Cotton Mills have shut down and posted notices saying that the plant will not be started up until the 1st of next April.

Woolen.

New Mills.

—*Maine, Phillips. The woolen mill which is being rebuilt by Hescock & Atwood is roofed in and will soon be ready for machinery.

—*Massachusetts, Blackinton. R. E. Schouler informs us that he has not made definite arrangements for his new mill yet. He expects to start in time for next season and will make high grade fancy worsteds, operating 8 or 10 looms at first and dyeing yarn. He probably will have his finishing done outside so that he will need to add only looms, a dresser and some spoolers.

—*Massachusetts, Lawrence. The new worsted combing plant built by Frederick Butler and leased to his sons, Franklin and Marcus Butler, is about ready to start up, and will run under the name of the Butler Worsted Mill. Later on they may put in spinning machinery. Cards are from Dobson & Barlow and combs from Taylor & Wardsworth.

—*Massachusetts, West Millbury. The Millbury Scouring Co., Thos. Windle & Sons, proprietors, whose plant was burned May 28, has its new building erected and is now installing the scouring, picking, dusting and carbonizing machinery.

—New York, Chester. Millidale Woolen Co. is the name of a new concern which is operating a shoddy mill at this place. Partners are William Todd, formerly of Amsterdam, and William Lancaster of Passaic.

—North Carolina, Oxford. Several leading business men of Granville and Vance counties, residing at Oxford and Henderson, have in contemplation the project of building a woolen mill in that section, which will probably be located at Oxford. An effort is now being made to form a company and raise sufficient capital, and prospects are very favorable to the successof the enterprise.

—New Mexico, Eddy. There is a report of a new wool scouring plant to be built at this place.

—Pennsylvania, Philadelphia. O. N. Falk & Co., 1907 North 6th St., have established a small plant for the manufacture of curtains.

Enlargements and Improvements.

—*Canada, Toronto. The Toronto Carpet Mfg. Co. inform us that foundation for their new mill was started Sept. 15th. William Steele & Son, of Philadelphia, are the builders and C. E. Rahn, of Philadelphia, architect. When finished, they will have a capacity of 70 ingrain looms and 25 Axminster and Smyrna looms; steam power. There will be a new dye house 35x100.

—*New York, Jamestown. The new mill of the Empire Worsted Mills will soon be ready to start up. The company has many orders and are anxious to get the new part running as soon as possible.

—Pennsylvania, Philadelphia. John O'Neil, 1623 McKean St., manufacturer of shoddy, will probably increase his plant in the near future.

—Pennsylvania, Norristown. Rambo & Regar have started to build a new dye house at their hosiery mill on East Main Street.

—Rhode Island, Greenville. The Greenville Woolen Co. is running its carding and spinning evenings and will install a plant for electric lighting.

—Rhode Island, Pascoag. Carding and spinning machinery is being placed in the Stone Worsted Mill, Samuel Mellor, proprietor. The plant has previously been equipped only with weaving.

Mills Starting Up.

—Connecticut, Broad Brook. The Broad Brook Woolen Mills have started up on full time after running 4 days a week since May.

—Connecticut, Moosup. The woolen mill of Milner & Co. is starting up its various departments, and will soon be running in full.

—Connecticut, Putnam. The Putnam Woolen Co., which has been closed down, is now starting up again.

—Connecticut, Shewville. W. G. Hitchon's Glen woolen mill, which was closed recently for repairs, is now running again.

—Connecticut, Stafford. Phoenix Woolen Co.'s mill has started up and is now running on full time.

—Maine, Calais. The woolen mill of J. M. Johnson & Co., at this place, started up Monday, Sept. 5th.

—Maine, East Wilton. The Walker Woolen Mills have been started up, after their summer vacation.

—Massachusetts, Blackstone. Work has been begun on the new mill for Charles Fletcher, of which a previous report was made in August. The addition will be 100 by 50, 3 stories high, which will contain looms enough to bring total capacity up to 300.

—Vermont, Springfield. W. H. H. Slack & Bro. are building an extensive addition to their carbonizing plant which will largely increase its capacity.

—*Massachusetts, North Adams. Strong Hewatt & Co. started up the Linwood Mills, Aug. 29th, having received a number of orders. This is the new company recently mentioned as to operate this plant.

—Massachusetts, Worcester. The Stoneville Worsted Co. has startd up again after a two weeks' shut down.

—Missouri, Carthage. The Carthage woolen mills, which were shut down about the first of August for repairs, have now been started up.

—New Hampshire, Tilton. The Elm Woolen Mills have their new mill started up and are running it night and day.

—New Jersey, Camden. The broad loom weavers at the Fries-Breslin Rug Works, who have been on a strike for higher wages, will return to work at the old rates.

—New York, Amsterdam. S. Sanford & Sons Carpet Mills, which have been shut down for repairs, are about starting up again.

—New York, Dolgeville. The felt mills of Alfred Dolge & Son, which were recently sold to S. R. Ingham of St. Johnsville, are now being started up and will soon be running in full. They have been closed since April 15th.

—Pennsylvania, Apollo. The new woolen mill which has been under construction for some months has been started up giving employment to about 30 people. Product is yarns, blankets and flannels. Mr. Flynn is the manager of the enterprise, to be known as the Apollo Woolen Mill.

—Pennsylvania, Langhorne. Rumf Bros. & Witty's new mill has been started up.

—Pennsylvania, Philadelphia. Speight & Robertshaw, who made an assignment last week and shut down, have started up their plant again. It is believed that they have made a settlement of their affairs and that the mill will continue to run.

—Rhode Island, Allentown. The Belleville Mills have started up after being shut down since the middle of August.

—Rhode Island, Pascoag. The Granite Mills, A. L. Sayles & Co., which have been closed for five weeks putting in boilers and making other improvements, are now starting up.

—Rhode Island, Bridgeton. The Clear River Woolen Mills, which have been closed down for the last six months, are going to resume operations.

—South Dakota, Sioux Falls. The Sioux Falls Woolen Mills are being overhauled and put in repair preparatory to starting up, probably under the management of F. W. Pettigrew. Mills have been closed for some time.

—Vermont, Proctorsville. Taft, Burbank & Murdock are starting up after the summer shut down.

Mills Shutting Down.

—Connecticut, Beacon Falls. The mill at this place last operated by the Standard Woolen Co., but which has been idle for about five years, has been purchased by Harris Whittimore of Naugatuck, Conn. Mr. Whittimore has not made any statement regarding how the property is to be used.

—Connecticut, Winnipauk. The mills of the Norwalk Mills Co. are running on half time.

—Maine, Turner. The woolen mill of F. T. Faulkner will shut down soon for an indefinite time. This will put 40 hands out of work.

—Massachusetts, Byfield. The Byfield Woolen Mills are shut down while work on the new dam and building is in progress.

—Massachusetts, Huntington. The Highland Mills will shut down for a short time.

—Massachusetts, Medway. Cole, Senior & Co.'s mill at this place has shut down for a few weeks. Mr. J. E. Cole, of Woonsocket, who died a short time ago, was the senior partner of this firm.

Knit.

New Mills.

—*Indiana, Fort Wayne. The project of a new knitting mill at this place, which has been mentioned from time to time, has materialized in the formation of the United Knitting Mills Co., which has purchased land adjoinng the Wayne Knitting Mills and is now preparing plans for a new building. The company will manufacture children's fashioned hosiery and will not be a competitor of the Wayne Knitting Mills.

—*Indiana, Fort Wayne. We have further official information as to the United Knitting Mills, which has purchased the plant of Frederick J. Thieme. An addition will be built to the present mill, for which foundation was started on Sept. 20th, and production of goods is expected to begin Nov. 1st. 40 new knitting machines will be put in bringing total up to 70. Misses' and boys', men's and women's seamless and misses' and boys' full fashioned ribbed hosiery will be made. Motive power electricity. No dye house. Capital is $35,000. W. E. Mossman, president; L. A. Searles, treasurer; F. J. Thieme, superintendent. Spies & Nissen, New York, are the selling agents.

—*North Carolina, Weldon. Referring to the new knitting mill at this place, we learn that the building will probably be commenced some time in October with the idea of beginning production in March. They will make low and medium grade underwear; operate by water power; have a dye house. W. T. Shaw and W. E. Daniel are interested.

—New York, Chestertown. C. H. Faxton & Son are remodelling their tannery building and will convert it into a knitting mill, which they will conduct. They are also rebuilding dam and making general improvements.

—North Carolina, Monticello. There is a project on foot to build a knitting mill, in which H. V. Allen, L. Benton and C. B. Jordan are interested. They are looking into the matter of cost, and at present writing there seems to be good reason to think a mill will be built.

—*North Carolina, Winston. T. J. Wilson writes us that his new plant was started Sept. 6th, employing 10 operatives. He has four knitting machines and makes ladies' vests.

—*Ohio, Dresden. The work of rebuilding the hosiery mill of Kapner Bros. & Duga Hosiery Co. has been begun.

—Pensylvania, Cressona. Clark & Beck is the name of a new firm which has been formed to operate a new hosiery mill at this place. William L. Beck has been in a similar line of business here. Mr. Clark comes from Hazelton.

—*Pennsylvania, Fleetwood. Kutz Bros. have about completed their new stone mill, which we have previously reported. They expect to remove machinery from their present mill in the near future.

—Pennsylvania, Mechanicsburg. A small new knitting factory will be established at this place by W. B. Railing, formerly of Philadelphia.

—*Pennsylvania, Philadelphia. The Krout & Fite Manufacturing Co. inform us that their new building on Allegheny Ave. and Emerald St., will be 44x200; office building separate; engine and boiler room separate. This mill will probably be running before Oct. 1st, 1898, and will employ 75 to 100 hands. Work has started on this building last June. Equipment includes 10 new knitting machines, 30 new looms, bleach house, steam power. This will give them a total of 60 looms and 22 knitting machines. Their product is lace edgings, cotton braids, spool tapes, silk and cotton narrow fabrics. Their present location is 2640 Mascher St.

—*Pennsylvania, Pottsville. We learn that Unger & Leininger is the name of the new firm which will succeed to the business of Unger & Fertig, which has dissolved partnership. The plant is removed from Nicholas St. to 20th and Market. An addition is being built and seven new knitting machines will be put in, bringing total number up to 13. Product is ladies' and children's ribbed vests and pants. While the mill is in Yorkville, P. O. address is Pottsville. Practically none of the new machinery has been bought, nor have the contracts been let for the power transmission. They are considering an electric light equipment, and may decide to use electricity as a motive power.

—*Pennsylvania, Reading. The new Eagle Knitting Mills, J. G. Frederick, sole proprietor, will contain 40 machines and will be located corner of 11th and Greenwich Sts. They will make fine seamless half hose and ladies' hose. 176 needles; steam power; dye house. Foun-

dation started about Sept. 20th and they expect to begin production about the 1st of December.

—*Pennsylvania, Cressona. We learn that the name of the new hosiery mill at this place will be the Beck Hosiery Co. Capital $5,000. They will make ladies' fine seamless hose; operate by steam power. The company is composed of W. H. Beck, wno was owner for one year and has now taken George R. Clark as partner, forming the above company. 10 new knitting machines will be put in making a total of 22. A. A. Smith of New York is selling agent.

—*Rhode Island, Woonsocket. Orie D. Banfill, formerly overseer of the Glenark Knitting Co., has leased for five years a one story frame building on Cass Ave., which is 45 by 26. Machinery will be installed for making fine grade knit goods. There is a 20 h. p. engine and boiler in the mill.

—*South Carolina, Newberry. E. B. Wilbur informs us that it is a hosiery mill and not a yarn mill which is beng talked of in Newberry. Nothing definite has been arrived at and it may or may not develop in to a reality.

Enlargements and Improvements.

—New York, Cohoes. An addition is to be built to the Globe Mill of F. W. Kavanaugh & Co., on Van Schaick Island. Contract for the building has been awarded to Neary Bros. and work will begin at once and be pushed rapidly forward to completion.

—New York, Little Falls. An addition is being made to the Astoronga Knitting Mill which will give needed room. It is reported that the mill will add to its line the manufacture of heavy ribbed underwear.

—*New York, Little Falls. The Victor Knitting Mills have begun work on the foundation of the new addition previously reported. Building will be 150 by 60, 5 stories. It is not expected that production will begin until next spring.

—Pennsylvania, Hawley. The United States Knitting Mills Co. has filed articles of incorporation. Capital stock to be $100,000; amount paid in, $75,000. The company will continue the business of H. Nollan, who has hitherto done business under the same name, making golf hose, sweaters, etc. It is probable that the business will be extended and new lines added.

—Pennsylvania, Spring City. W. C. Urner & Co. will build a dye house at their Spring City hosiery mill.

—South Carolina, Bamberg. The Bamberg Knitting Mill is now under the management of John Mier, formerly of the Manning, (S. C.) knitting mill. A dyeing department will be put in and product will be full hose and half hose.

—Virginia, Portsmouth. The Portsmouth Knitting Mills expect to install some new knitting machinery in the near future.

—*Virginia, Portsmouth. The Portsmouth Knitting Mills confirm the report that they will put in new machinery. They will probably install 20 to 30 new latch needle machines. They make underwear.

—*Wisconsin, Sheboygan. The Sheboygan Knitting Co. state that will put in two sets of woolen cards, which will give them three sets total and 125 knitting machines. They have a dye house and their product is lumbermen's hosiery, gloves, mittens, and bicycle leggins.

Mills Starting Up.

—New York, Stittville. The Empire Knitting Mill has started up after a month's shut down on account of the washout of the dam.

—Pennsylvania, Scranton. The Lacka-Absorbent Linen Co., of which E. O. wear, which have been idle for the past two months, have resumed work.

—Vermont, Jonesville. R. J. Robinson started his underwear mill Sept. 5th. This is a branch of the Baker Underwear Co., of Peekskill, N. Y.

Mills Shutting Down.

—New Hampshire, Laconia. J. W. Busiel & Co., manufacturers of woolen hosiery, have shut down. Woolen hosiery business is very quiet.

—Vermont, Bennington. The Cooper Mills are shut down for a few weeks to make repairs.

—Vermont, Bennington. The Bennington Knitting Co. has resumed operations after a shut down of a few weeks. H. E. Bradford's mill, which is undergoing alterations and additions, previously reported, will probably not be ready to start up before the 1st of November.

Silk.

New Mills.

—New Jersey, Paterson. DeGray & Ruger are starting up a few looms for the manufacture of broad silks at Midland Park in the Stone Mill. Both members of the firm were formerly in the employ of the P. & I. Bannigan Co.

—New York, Kingston. E. T. Stelle and John H. Gregory are receiving subscriptions for a contemplated silk industry to be located at this place.

—Pennsylvania, Allentown. Ground has been broken for a new silk mill in South Allentown, which will be called the Rioner Silk Co. It is expected that it will be finished by Jan 1st. It will be both a weaving and throwing mill; 2 stories high; 50x150.

—*Pennsylvania, Coatesville. Ashley & Bailey's new silk mill at this place is now progressing rapidly. Building is 300x52, 3 stories, brick. The engine and power house are nearly roofed and some of the machinery has arrived. The mill is expected to be completed in October.

Facts and Gossip.

—Colorado, Durango. It is proposed to build a wool scouring mill at this place.

—Connecticut, Mystic. The Rossie Velvet Co. now has 40 looms running and more will be added. Business is very good and production well sold up.

—Connecticut, Rockville. The Ameri-

can Mills are running their carding and spinning night and day. They have a large order for army overcoatings.

—Connecticut, Rockville. All the Rockville woolen mills are now running full time and some of them overtime.

—Connecticut, Rockville. The American Mills are running all night with an extra set of help. They have received a very large order for government cloth.

—Connecticut, Willimantic. It is understood that the Willimantic shop of the Atwood, Morrison Co., builders of silk machinery, is to be removed to Stonington, where the main plant is located.

—Massachusetts, Franklin. The United States Rubber Co's plant, on Fisher St., has been purchased by Joseph G. Ray, and it is understood that the mill be remodelled and occupied by the Singleton Worsted Co., of which George F. S. Singleton is president and treasurer.

—Massachusetts, Hinsdale. The Hinsdale Woolen Co. is running 5 days a week.

—Massachusetts, Housatonic. The Monument Mills are starting up a few new looms and are very busy in their quilt mills.

—The Massachusetts, Newburyport. The real estate and machinery of the Peabody Mills will be sold at auction on Nov. 9th. The plant contains about 35,000 spindles, 768 looms, with complete power and transmission plant, etc. It has been idle for some time.

PERSONAL RECORD.

Cotton.

—C. H. Bronson, who has had charge of the gingham plant of the Highland Park Coton Mfg. Co., Charlotte, N. C., has been transferred to the position of superintendent of the Standard Cotton Mill, Rock Hill, S. C., which latter mill has been bought by the Highland Park Co.

—Harry Adams, formerly second hand at Troy Mill, Fall River, has been promoted to the position of overseer of weaving made vacant by George Walsh, resigned.

—John Anderson is in charge of spinning department at the Sibley Mill, Augusta, Ga.

—George F. Annis has resigned as foreman at the Naumkeag Mills, Salem, Mass., where he has been employed for a number of years.

—Robert Armistead, formerly loom fixer in the Slade Mill, Fall River, is now second hand in the weave room of the Mechanics Mill, Fall River.

—J. H. Barnes is now overseer of carding and spinning at the Selma Cotton Mill Co., Selma, Ala.

—E. T. Barnes, overseer of spinning at the Granby Mills, Columbia, S. C., has resigned to accept a similar position in an Alabama mill.

—George Barry, of Danielson, Conn., has accepted a position as overseer of the card room in Webster.

—Edward C. Beach has resigned his position as superintendent of the Lockhart Mills, Lockhart, S. C., to become superintendent of the Massachusetts Mills, Lindale, Ga.

—Daniel F. Bean, who for many years has been connected with the Atlantic Cotton Mills, Lawrence, Mass., and for the last six years superintendent, has resigned. It is not known what his plans are.

—H. A. Bell has resigned as overseer of carding and spinning at the Fairfield Cotton Mills, Winnsboro, S. C., owing to ill health.

—E. C. Bennett has accepted a position in charge of carding and spinning at the Ellicott City (Md.) Cotton Mill.

—J. H. Birtwistle, of Jewett City, Conn., has resigned his position as boss spinner.

—Fred Brown, son of Samuel Brown, superintendent of the Nashawannuck Mfg. Co., Easthampton, Mass., will attend the Philadelphia Textile School this year.

—Albert H. Carroll has received the appointment as manager of the Laurel Cotton Duck Mills, at Laurel, Md.

—William Ernest Chesswell, superintendent of the Courtenay Cotton Mills, Newry, S. C., was married on Aug. 17, to Miss Annie May Jones, of Westminster, S. C.

—R. F. Coble, who has been in the employ of the Odell Mfg. Co., Concord, N. C., for a number of years, has been appointed superintendent of that company.

—W. J. Colbert has resigned as second-hand in the weave room of the Slade Mills, Fall River, Mass., and is now with the Slater Mfg. Co., Webster, Mass.

—James Collins, of West Warren, Mass. has accepted a position as overseer of carding and spinning in Lawrence.

—Archie Cooper is now boss carder in the Manchaug Mills, Manchaug, Mass.

—E. C. Darden, formerly slasher tender at Prattsville Cotton Mills, Prattsville, Ala., is now employed in a similar capacity at the Palmetto, Ga., mill.

—J. L. Davidson, formerly with the Avondale Mills Co., Birmingham, Ala., is now superintendent of the Tuscaloosa Mill, Cottondale, Ala.

—J. L. Eddleman, formerly overseer of carding and spinning at the Grendell Mill, Greenville, S. C., is now filling the position of overseer of carding at the Enoree Mfg. Co., Enoree, S. C.

—F. E. Wagg has resigned as overseer of weaving in Acushnet Mill No. 2, New Bedford, Mass., and has removed to Maine, where he has accepted a position.

—William Varley has resigned as overseer of weaving at Shove Mill No. 1, Fall River.

—Ariel Edwards has resigned his position with the Social Mfg. Co., Woonsocket, R. I.

—Edward Farrall, recently of Fall River, Mass., has accepted the position of superintendent of the Anchor Mill, Huntersville, N. C.

—A. Fuller, recently slasher tender at the Globe Mill, Utica, N. Y. has removed to Lawrence, Mass.

—John Gilligan, the former superintendent of the Fort Mill Cotton Mfg. Co.'s mill, Fort Mill, S. C., has accepted the superintendency of the Edna Cotton Mill, Reidsville, N. C., and will take charge Oct. 1.

—James Gilligan, until recently superintendent of the Lorraine Mill, Pawtucket, R. I., who was recently appointed superintendent of the Fort Mill Cotton Mfg. Co.'s mill at Fort Mill, S. C., took charge of the latter mill this week.

—Lewis Guion, of Charlotte, N. C. is reported as likely to be the superintendent of the new Norwood, N. C., mill, now being constructed.

—William J. Hadfield, overseer of carding room of the Atlantic Mills, Lawrence, Mass., has been appointed superintendent, which position was made vacant by the resignation of D. F. Bean. His brother, Charles Hadfield, succeeded him as overseer of carding room.

—Thomas W. Harvey is now superintendent of the Holt-Morgan Mills, Fayetteville, N. C.

—Robert A. Hildreth, formerly slasher tender at the Palmetto, Ga., mill, has accepted a similar position with the Indian Head Mill, Cordova, Ala.

—Clarence A. Horne, for the past two years overseer of the weaving and dressing department of the Exeter Mfg. Co., Exeter, N. H., has resigned to accept a position with the Great Falls Mfg. Co., Somersworth, N. H.

—B. F. Houston has been transferred back again to Heath Bros.' mill at Monroe, N. C., on account of the recent fire at their Manetto Mill at Lando, S. C., where he has been superintendent.

—Jesse Knight has been appointed superintendent at the new Lawton Mill, Olneyville, R. I.

—Charles A. Leach, of Pawtucket, R. I., is now spinning overseer at the Fitchburg Duck Mill, Fitchburg, Mass.

—W. G. Loveland, formerly at the Gilbert Mills, Ware, Mass., has accepted a position in one of the card rooms of the Otis Co., Ware, Mass.

—D. McGraw, of Nashville, Tenn., is the new superintendent at the Augusta factory, Augusta, Ga. Mr. McGraw was proprietor of the Algernon Mills of Augusta, at one time.

—D. M. Meakins, formerly of the Roanoke Mill, Roanoke Rapids, N. C., has taken charge of the spinning department of the Red Bluff Mill, Clio, S. C.

—J. T. Moreland, recently with the Henrietta, (N. C.) Mill No. 2, is now employed at the Granby Mill, Columbia, S. C., as spinning overseer.

—William T. Noah has been appointed carder and spinner of the Eno Cotton Mills, Hillsboro, N. C., having succeeded T. J. McNeely, who resigned.

—Dolph Parsons, formerly overseer of beaming at the Worth Mills No. 2, Central Falls, N. C., is now overseer in the weave room.

—J. M. Phillips has secured the position of boss carder at the Fairfield Mill, Winnsboro, S. C.

—H. E. Schouler has resigned the superintendency of the Shove Mills, Fall River, Mass.

—Walter M. Scranton, of Oxford, Ala., has accepted the position of overseer of spinning at the Fulton Bag & Cotton Mills, Atlanta, Ga.

—S. B. Shipp, formerly superintendent of the Chewalla Cotton Mfg. Co.'s mill at Eufaula, Ala., has been appointed superintendent of the Norris Cotton Mill Co.'s mill at Catachee, S. C.

—T. A. Shipp is now superintendent of the Fairfield Mills, Winnsboro, S. C.

—B. L. Stell, formerly of Greenwood, S. C., has been secured by the Buffalo Thread Mill, Concord, N. C., as night superintendent.

—M. E. Stevens, of Cordova, Ala., is now boss carder at the Maginnis Cotton Mills, New Orleans, La.

—John Stritmuller, recently overseer of spinning room No. 2, Lane Mills, New Orleans, has been re-engaged at the Henrietta Mills, Washington, La., as boss spinner, the mills having just started up again.

—Charles E. Thomas, ring spinner at the Fitchburg (Mass.) Duck Mill, has resigned.

—Henry C. Thompson, of Maryland is now overseer of spinning, spooling, twisting, and reeling at Blue Springs Cotton Mills, Oxford, Ala.

—John F. Tibbetts has resigned his position with the Davis & Thurber Machine Co., to accept a position of superintendent of the Riverside Mills, Montmorency Falls, Quebec.

—George Walsh, weaving overseer at the Troy Mill, Fall River, has accepted a similar position at the Hargraves Mill, No. 1, Fall River.

—P. Welsh is boss spinner at the Lawton Mill, Olneyville, R. I.

Woolen.

—Charles Ainsworth, boss carder at E. Kenyon & Sons' mill, Kenyon, R. I., has resigned.

—James Barnes has resigned as loom fixer in the Atlantic Mills, Olneyville, R. I., and gone to Europe.

—William Brady, of Putnam, Conn., has succeeded John Rourke as dresser in L. Keegan & Son's Mill, Wilsonville, Conn.

—William Brady has resigned as carder with the Kent Mfg. Co., Philadelphia, to accept the position of overseer of carding and spinning at the Holstein Woolen Mill, Salem, Va.

—John Connors, formerly second hand of spinning at the Gilbert Mill, Ware,

Mass., has been appointed overseer at the Hoyle Woolen Mill, West Millbury.

—E. E. Crawley formerly assistant superintendent of the Pomeroy Mills, Pittsfield, Mass., has gone into business on his own account.

—J. H. Creaser has resigned from the dyeing department of the Stevens' Mills, North Andover, and is now at work in Mechanicsville, N. Y.

—Thomas Curtis, Jr., has secured the position of second hand in the card room of the White Mill, Voluntown, Conn.

—P. H. Degan, formerly of Braintree, has accepted position as boss spinner at the Ipswich Mills, Ipswich, Mass.

—J. Elliott has resigned as superintendent at North Andover, Mass.

—H. Fitzroy, of Fitchburg, has succeeded the late E. M. Hunt as overseer in the finishing room of J. D. Clark Co.'s mill at Rochdale.

—H. B. Frazier, formerly finisher at the Summit Mill, Staffordville, Conn., is now at Sayes & Jenks, Warren, Mass.

—D. W. Hagar, of Jefferson, Mass., has been appointed superintendent at Hope Valley, R. I.

—Arthur Healey, of Madison, Me., has been employed in the wool department of the Waverly Woolen Mill, Pittsfield, Me.

—William Illingworth, boss spinner for the Kezar Falls (Me.) Woolen Mill has resigned to accept a position as boss weaver in East Wilton, Me.

—J. A. Jubb, recently boss finisher at the Riverside Mill, Staffordville, Conn., is now employed in a similar capacity by Milner & Co., Moosup.

—John Kiley, of Stafford Springs, is now boss spinner with the French River Textile Co., Mechanicsville, Conn.

—Andrew Kilgour, formerly at Glenville, Conn. is now with F. A. Lapham at the Jamesville Mill, Worcester, Mass.

—C. Lapp, carder; Charles Shepard, finisher, and Thomas Laidlaw, weaver have recently been engaged by William U. Hanke, superintendent of the San Jose Woolen Mill, San Jose, Cal.

—John F. Leonard, recently overseer of dyeing at the Glenville (Conn.) Woolen Co., has taken charge of dyeing at the Conshohocken (Pa.) Woolen Co.

—George Lyon has accepted the superintendency of the Lowell Mfg. Co.'s ingrain department, Lowell, Mass.

—D. W. McAllister, of Fairmount, W. Va., has secured a position as loom fixer at Keyser, W. Va.

—F. S. Moore, formerly with the Muskingum Valley Woolen Mfg. Co., Dresden, Ohio, is now with the South Bend (Ind.) Woolen Co.

—Welcome Mortimer has removed to West Millbury, Mass., to accept position as boss weaver with Edwin Hoyle & Son. Mr. Mortimer was formerly employed in that capacity by the Merchants' Woolen Co., Dedham, Mass.

—F. B. Mowry, formerly carder at the Crawford & Tyler Mill, North Dana, Mass., is now carding overseer at the Otsego Mills, East Brookfield.

—M. J. Nelson, second hand in the finishing department of the Farwell Worsted Mills, Central Falls, R. I., has resigned and is now with the Hawthorne Woolen Mill, Glenville, Conn.

—W. H. Pettytt, of Stafford Springs, is now boss dyer in Woonsocket, R. I.

—F. W. Phelps, boss carder at the Old Town Woolen Co., Old Town, Me., has been promoted to the position of assistant superintendent made vacant by J. W. Beattie, resigned.

—J. W. Porter, of Bridgton, Me., has accepted the position of loom fixer with Amos Abbott & Co., Dexter, Me.

—Thomas Robertshaw, formerly fuller at the Collinsville Mills, Dracut, Mass., and recently with the North Andover Mills, has gone back to his old position at the Collinsville Mills.

—Herbert A. Rowell has accepted a position as boss dyer with E. M. Rockwell, Leominster, Mass.

—James Russell, of Shewville, has been appointed overseer of weaving in Benjamin Lucas & Co.'s mill, Norwich, Conn.

—Thomas Ryan has been employed as carder at the Miller River Mill, Athol, Mass.

—James Shaw, formerly second hand weaver in the Merrimack Woolen Mills, has been employed as boss weaver in the Squam Lake Mills, Ashland, N. H.

—John Sherman, formerly with the Muskingum Valley Woolen Mfg. Co., Dresden, Ohio, is now with the South Bend (Ind.) Woolen Co.

—Edward St. Ledger, weaver in the Merrimack Woolen Mills, has removed to Wilton, N. H., where he has a position.

—John F. Timmermann, of Franklin, Mass., has been engaged by the Glenlyon Dye Works, Saylesville, R. I., to take charge of their shearing.

—Charles H. Woodbury is reported to have resigned his position as superintendent of the Hope Valley Woolen Co., Hope Valley, R. I.

Knit.

—L. F. Edwards has resigned as president of the Athens Knitting Mills, Athens, Ga.

—F. G. Giddings, formerly of Amsterdam, has accepted a position as overseer of knitting in the Gloversville (N. Y.), Knitting Co.

—E. L. Holland, of Maine, has succeeded E. H. Bloodworth as superintendent of the Stafford-Huguley Hosiery Co., Barnesville, Ga.

—Daniel Keelcher, of Little Falls, N. Y., is in charge of the Clover Knitting Co.'s mill at Waterford. He has had 12 years' experience with the Eagle Mills and three with the Saxony.

—J. B. Heslin, carder in the Troy Knitting Co.'s mill, Albia, N. Y., has resigned.

—James Carney, of Pittsfield, Mass., is now boss carder at the Hudson Valley Knitting Mill, Cohoes, N. Y.

—Whittaker Demain has been appointed overseer of picking in the Atlantic Knitting Mill, Cohoes, N. Y.

—Robert Van Tassel, assistant engineer at the Boston Duck Co.'s mills, Bonds-

ville, Mass., is now chief engineer at the factory of the Shaw Stocking Co., Lowell, Mass.

Miscellaneous.

—Louis Dumas, for 15 years overseer of the weaving department and warping room at Belding's Silk Mill, Northampton, Mass., has resigned and will move to California.

—Charles H. Frinck, who has recently been assistant superintendent in the weaving department of the Belding's Silk Mill, Northampton, Mass., has succeeded Louis Dumas as overseer of the weaving department and warping room.

—J. C. Harrington, of Victory Mills, Amsterdam, N. Y., is now in charge of the bleaching plant of Prince, Torres & Prince, Durango, Mex.

—Henry Owens, draughtsman for the Whitin Machine Works, Whitinsville, Mass., sailed recently for Paris, France, where he will study for a short time.

—Fred E. Seavey has been appointed superintendent and general manager of the Eureka Silk Co., Canton, Mass.

—Henry Wilson, of Baltimore, who has been working in the Odell Mills, Concord, N. H., has started for Philadelphia to attend the Philadelphia Textile School for a term.

—Alexander F. Crichton has succeeded his father as superintendent of the Planet Mills, Brooklyn, N. Y.

Deaths.

—William T. Ryle, senior member of the firm of William Ryle & Co., one of the largest importers of raw silk, and also interested in silk manufacturing, died Sept. 22, at his cottage in Cape May, N. J., after only a day's illness. He was very largely interested in the Sauquoit Silk Mfg. Co., which has several mills in Pennsylvania and New York. He was very prominent in business circles in New York City, had a wide social acquaintance and was a member of many of the prominent city clubs. Mr. Ryle was of English ancestry, but a native of New York City. His loss will be keenly felt not only in social circles, but by the many business enterprises with which he was closely connected and of which he formed such a prominent factor.

—Eben Adams, boss weaver in the woolen mills at North Berwick, Me., died recently.

—Edward B. Hayden, formerly of Plymouth, Mass., for many years connected with the manufacture of cotton duck, died recently at Braintree. When the duck mills shut down several years ago, Mr Hayden went to South Carolina, where he intended to build a cotton mill, but his health failing, he was obliged to abandon the enterprise and return to his home, and has never recovered his health.

—Joseph W. C. Seavey, superintendent of the Eureka Silk Co., at Canton, Mass., died recently at the age of 62 years. He was born in Maine and spent almost all his business life in the Eureka Silk Mill, rising to the position of president of the corporation and then leaving it to return some years later as superintendent, which position he held at the time of his death.

—William Dobson, one of the best known citizens of the Falls of Schuylkill, Pa., died recently at the age of 74 years. He was the brother of John and James Dobson, and came to this country in 1861. For many years he has acted as manager of the Dobson blanket and cloth mills.

—Joseph E. Cole, widely known in textile circles in Rhode Island and Massachusetts died recently at his home in Woonsocket, at the age of 74. For many years he was the treasurer and manager of the Harris Woolen Co., becoming connected with that company in 1854 and introducing the plan of selling the mills' product direct. In 1879, he was made treasurer and held that position until he died. He was also president of the American Worsted Co., and some years ago became senior partner of the firm of Cole, Senior & Co., operating a woolen mill at Medway, Mass. He was prominently connected with the banking interests of Woonsocket, and a leading citizen. He leaves a widow, one daughter and a son, the latter being connected with the firm of Cole, Senior & Co.

—John Doak, the founder of the dyeing and finishing firm of John Doak's Sons on Front St., above Huntingdon, Philadelphia, died recently. He retired from business in 1888, and the establishment has since been conducted by his sons.

—Albert Harvey, superintendent and one of the owners of the Harvey Silk Mill, at Scranton, Pa., died recently of appendicitis. He was 48 years old, a native of Connecticut, but for 16 years a resident of Scranton. He leaves a wife and two children.

—David Nevins, of the firm of Nevins & Co., died recently while traveling in Germany. The Nevins family controlled the Pemberton and Methuen Companies, Mr. Nevins being president of the former and treasurer of the latter. He was also largely interested in the Stevens Linen Works, and was president of the American Mfg. Co., controlling a large number of jute, bagging, twine, and cordage mills. He was also largely interested in the Pettee Machine Works.

—G. M. Makepeace, one of the oldest cotton mill men in North Carolina, died on August 30th, at his home in Franklinsville, N C., aged 71. He was of old New England stock, his father removing to the South but a short time previous to the birth of the deceased. Mr. Makepeace leaves several sons who are engaged in the cotton mill business in the Carolinas, and one, also his son, C. R. Makepeace, a mill architect of Providence, R. I.

—Samuel Paterson, of Dannemora, N. Y., died on Sept. 7. He had recently been appointed superintendent of the knitting in the penitentiary, and previous to that was superintendent of several knitting mills in New York State.

—John Elkengren, clerk for 30 years in the Lowell Mfg. Co.'s wool department, died recently at the age of 63 years.

Samuel A. Crozier, the well known cotton Manufacturer of Upland, Pa., died suddenly in Paris, France, August 24, aged 34 years.

—William Breedon, head of the firm of William Breedon & Sons, large knitting needle manufacturers, Amsterdam, N. Y., died recently at the advanced age of 71 years. Mr. Breedon was a man of the highest business integrity and prominent in the affairs of Amsterdam. At one time he was mayor of the city. His death will be keenly felt by a large circle of business and social acquaintances.

—Joseph D. Charles, manager of the Reedy River Mfg. Co., Reedy River, S. C., died recently of paralysis at the age of 54 years.

BUYERS' INDEX.

Advertisers whose names do not appear under desired headings will please notify the publishers. Such omissions are accidental, not intentional.

Alphabetical Index to Advertisements follows this Classified List.

Architects and Mill Engineers.

Berlin Iron Bridge Co, The, East Berlin, Ct.
Ferguson, John W, Paterson, N. J.

Automatic Feeds for Cotton and Wool.

Harwood, Geo. S, & Son, 53 State St, Boston.
Woonsocket Machine & Press Co, Woonsocket, R. I.

Balling Machine.

Torrance Mfg. Co, 18 Davis St, E. Newark, N. J.

Bandings.

See under Yarns.

Belting.

Alexander Bros., 410 No. 3d St., Phila., Pa.
Billington, J. H. & Co., 113 Chestnut St., Philadelphia.
Boston Belting Co., 256 Devonshire St., Boston, Mass.
Fell, Geo. & Son, Bolton, England.
Link Belt Machinery Co., Chicago, Ill.
See also Mill Supplies.

Belt Dressing.

Alexander Bros, 410 No. 3d St, Phila, Pa.

Bindings.

See Tapes and Braids.

Bleaching Materials.

Roessler & Hasslacher Chemical Co, 100 William St, New York.

Bobbins, Spools, Shuttles, Etc.

Nashua Spool and Bobbin Co., Nashua, N.H.

Boiler Compounds.

Carr Manufacturing Co., 69 Beverly St, Boston.

Boxes, Cloth Boards, Etc.

Pearson, J. T, Kensington, Pa.

Braids.

See Tapes, Braids and Edgings.

Burr Pickers.

Curtis & Marble Machine Co., Worcester, Mass.
Sargent's, C. G., Sons, Graniteville, Mass.

Card Clothing.

Ashworth, Elijah, Fall Biver, Mass.
Leigh, Evan A, 35 Mason Building, Boston.

Calico Printers' Machinery and Supplies.

Butterworth, H. W., Sons & Co., Philadelphia.
New Bedford Copper Co, New Bedford, Mass.
Phillips Co, The Thomas, Providence, R. I.
See also Dyeing, Bleaching Machinery, etc.

Carders' Tools.

Brown, W. H, Mechanic St, Worcester, Mass.

Carpet Machinery.

Altemus, W. W, & Son, 2816 N. 4th St, Phila, Pa.
Crompton & Knowles Loom Works, Worcester, Mass.
Curtis & Marble Machine Co, Worcester, Ms.
Furbush, M. A, & Son, Machine Co, Phila, Pa.
Howard, Geo. C., 1783 Barker St., Phila., Pa.

Chemicals and Apparatus.

Bullock & Crenshaw, 528 Arch St, Phila, Pa.
Roessler & Hasslacher Chemical Co, 100 William St, New York.

Chemist.

Adriance, John S., 105 East 39th St., New York.

Cloth Testing Machine.

McKnight, S, 771 Broadway, New York.

Combs (Wool and Cotton).

Crabb, William, & Co, Newark, N. J.
Townsend, Thomas, 157 Orange St., Providence, R. I.

Comber Needles.

Townsend, Thos., Providence, R. I.

Copper Print Rollers.

New Bedford Copper Co, New Bedford, Mass.
Phillips Co, The Thomas, Providence, R. I.
Revere Copper Co, 174 Oliver St, Boston.

Copper Work for Dyers.

Phillips Co, The Thomas, Providence, R. I.

Cotton (Egyptian).

Stoddard, Haserick, Richards & Co., Boston.

Cotton Gin.

The Prior Cotton Gin Co., 327 Chestnut St., Philadelphia.

Cotton Machinery.

Altemus, W. W, & Son, 2816 N. 4th St, Phila-Pa.
Ashworth, Elijah, Fall River, Mass.
Cobb, Thad. S., Machinery Co., Lowell,
Crompton & Knowles Loom Works, Worcester, Mass.
Curtis & Marble Machine Co, Worcester, Mass.
Draper Company, Hopedale, Mass.
Fairmount Machine Co, 22d and Wood Sts, Philadelphia.
Howard & Bullough American Machine Co, Pawtucket, R. I.
Kilburn, Lincoln & Co, Fall River, Mass.
Leigh, Evan A, 35 Mason Building, Boston.
Lowell Machine Shop, Lowell, Mass.
Mason Machine Works, Taunton, Mass.
Phillips Co, The Thomas, Providence, R. I.
Stoddard, Haserick, Richards & Co, Boston, Mass.
Townsend, Thomas, 157 Orange St., Providence, R. I.
Whitin Machine Wks, Whitinsville, Mass.
Woonsocket Machine & Press Co, Woonsocket, R, I.

Cotton Openers and Lappers.

Howard & Bullough American Machine Co, Pawtucket, R. I.

Cotton Presses.

Planters' Compress Co, 89 State St, Boston.

Cutters for Knit Fabrics.

Kennedy, Thos. (Cutters, etc.,) Cohoes, N. Y

Designers.

Fresnel, Gustave, 125 W. 56th St, N. Y.

Dextrine.

Stein, Hirsh & Co, 165 Duane St., New York.

Dryers.

Philadelphia Textile Machinery Co, Philadelphia, Pa.
Phillips Co, The Thomas, Providence, R. I.
Sargent's, C. G., Sons, Graniteville, Mass.
Sturtevant, B. F. Co, 34 Oliver St, Boston, Mass.

Dusters.

See Wool and Waste Dusters.

Dyeing, Bleaching and Finishing.
Brophy's, T, Sons, Jasper St, Philadelphia.
Greenwood, R. & Bault, Frankford, Pa.
Home Bleach & Dye Works, Pawtucket and Valley Falls, R. I.
Littlewood, G. J., & Sons, Manayunk, Pa.
Warren, W, Thread Works, Westfield, Mass.
Webster Dye Works, Webster, Mass.

Dyeing, Drying, Bleaching and Finishing Machinery.
Butterworth, H. W, & Sons Co, Phila, Pa.
Curtis & Marble Machine Co, Worcester, Mass.
Fairmount Machine Co, 22 and Wood Sts, Philadelphia.
Granger Foundry & Machine Co, Providence, R. I.
Hopkins, A, & Co, Bridgeton, R. I.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Lincoln, The, Co, 54 Arch St, Hartford, Ct.
Phenix iron Foundry, Providence, R. I.
Phillips, The Thomas Co, 91-95 South Main St, Providence, R. I.
Sturtevant, B. F. Co, 34 Oliver St, Boston, Mass. (Drying.)
Woonsocket Machine & Press Co, Woonsocket, R. I.
Woonsocket Napping Machine Co, Woonsocket, R. I.

Dye Sticks.
Haedrich, E. M, 311 1-2 Walnut St, Phila, Pa.

Dyestuffs and Chemicals.
Amend Process Co., 205-211 Third Ave., New York.
Anchor Color Mfg. Co, 464 Cherry St, New York.
Bischoff, & Co, 87 Park Place, N. Y.
Bosson & Lane, 36 Central Wharf, Boston.
Cochrane Chemical Co., 50 Kilby St., Boston.
Corey, S. J, 273 Congress St, Boston.
Dillon & Co, 20 Cedar St, New York.
Farbenfabriken of Elberfeld Co, 40 Stone St, N. Y.
Geisenheimer & Co, 189 Front St, New York.
Hanna-Schoellkopf Co, Philadelphia, Pa.
Innis & Co, 3 Cedar St, New York.
Jaeck Bros., The, Co., 62-68 No. 11th St, Brooklyn, N. Y.
Janney, O. S, & Co, Phila. and Boston.
Johnson, Chas. A, & Co, 22 Dey St, N. Y.
Johnson, Wm. G, & Co, Uncasville, Conn.
Keller, John J, & Co, 104-106 Murray St, N. Y.
Klipstein, A, & Co, 122 Pearl St, N. Y.
Koechl, Victor, & Co, 122 Hudson St, N. Y.
Matheson, W. J, & Co, 182-184 Front St, N. Y.
Merrimac Chemical Co, Boston, Mass.
N. Y. & Boston Dyewood Co, 55 Beekman St, New York.
Oakes Mfg. Co, 93 Pearl St, N. Y.
Pickhardt & Kuttroff, New York.
Roessler & Hasslacher Chemical Co, 100 William St., New York.
Sharpless Dye Wood Ext. Co, 22 N. Front St, Phila, Pa.
Stamford Mfg. Co, 133-137 Front St., N. Y.
Stone & Ware Co, The, 157 Maiden Lane, N. Y.
Sykes & Street, 85 Water St, N. Y.
Thomas, N. Spencer, Elmira, New York.
Webster Dye Works, Webster, Mass.

Dyers and Finishers.
Boston Finishing Works, Williamstown Mass.
Cranston Worsted Mills (yarns), Bristol R. I.
Firth & Foster Co, Kensington, Pa.
Greenwood, R, & Bault, Frankford, Pa.
Home Bleach & Dye Works, Pawtucket, R. I.
Oakdale Dye Works, 913 W. York St, Phila, Pa.
Pawtucket Dyeing & Bleaching Co, Pawtucket, R. I.
Warren, W, Thread Works, Westfield, Mass.
Webster Dye Works, Webster, Mass.

Dyers' Clogs.
Wildman, Jos, & Co, 1908 N. Front St, Phila.

Edgings.
See Tapes, Braids and Edgings.

Electrotyping and Printing.
Whitcomb, H. C, & Co, Boston.

Elevators.
Cohoes Foundry & Machine Co, Cohoes, N. Y.
Eastern Machinery Co, The, New Haven, Conn.
Howard, Geo. C., 1783 Barker St., Phila., Pa.

Engineers, Mechanical.
Berlin Iron Bridge Co, E. Berlin, Ct.
Ferguson, John W, Paterson, N. J.

Express Money Orders and Travelers' Cheques.
American Express Co. offices in every city

Fans—Exhaust and Ventilating.
See Ventilating Apparatus.

Feeders
See Card Feeds.

Feed Water Pumps.
Goulds Mfg. Co, Seneca Falls, N. Y.
Phœnix Iron Foundry, Providence, R. I.

Finishing Machinery.
See Dyeing, Drying, Bleaching and Finishing.

Fire Extinguishers.
H. R. Bennett, 1217 Filbert St., Phila.

Fluted Rolls.
Cohoes Foundry & Machine Co, Cohoes, N. Y
Thurston, A. G, & Son, Box 528, Fall River. Mass.

Fulling Mills for Woolen Goods.
Hopkins, A, & Co, Bridgeton, R. I.
Hunt, Rodney, Machine Co, Orange, Mass.
Hunter Jas, Machine Co, No. Adams, Mass.

Gas Engines.
Jones, Lewis, 60½ and Media Sts, Phila, Pa.

Gas Singeing Machines.
Butterworth, H. W. Sons Co., Philadelphia.
Curtis & Marble Machine Co, Worcester, Ms.

Gear Cutting Machine.
Blaisdell, P, & Co, Worcester, Mass.
Whiton, The D. E, Co, New London, Conn.

Harness Varnish.
D. L. Witmer & Bro, 5th St. and Germantown Ave, Philadelphia.

Heating.
See Ventilating.

Heddles.
Watson, L. S, Mfg. Co, Leicester, Mass.

Hosiery Boards.
Pearson, J. T, Kensington, Pa.

Hose and Rubber Goods.
Boston Belting Co., 256 Devonshire St., Boston.

Ink, Stamping.
Witmer, D. L, & Bro, 5th St. and Germantown Ave, Philadelphia.

Insurance (Employers' Liability).
Employers' Liability Assurance Co, 28 Central St, Boston, Mass.

Knit Goods Edgings, Trimmings, etc.
Cheney Bros, Silk Goods, 479 Broome St, N. Y.
Friedberger & Co, Edgings, Germantown Phila, Pa.
Hepner & Horwitz, Lacings, 30 Howard St, N. Y.
Krout & Fite Mfg. Co, 2632 Mascher St, Phila.
Weimar Bros, 1817 East York St, Phila. Pa.

Knit Goods Finishing Machines, Crochet, Etc.
Excelsior Sewing Machine Co, 120 N. 7th St, Phila, Pa.
Merrow Machine Co, The, Hartford, Conn.
Nye & Tredick, 606 Arch St, Phila, Pa.
Scott & Williams, 2079 E. Cumberland St, Phila, Pa.

Knit Goods Brushers.
Ardrey, S. B, & Sons, Bristol, Pa
Jones, Lewis, Philadelphia, Pa.

Knitting Machine Cylinders.
Paxton & O'Neill, 129 Bread St, Phila, Pa.
Stafford & Holt, Little Falls, N. Y.

Knitting Machinery.

Boss Knitting Machine Works, Elm and Reed Sts., Reading, Pa.
Branson Machine Co., 506 John St., Philadelphia.
Brinton, H, & Co, 213 Race St, Phila, Pa.
Campbell & Clute, Cohoes, N. Y.
Cooper, Chas, Bennington, Vt.
Crane Mfg. Co, Lakeport, N. H.
Excelsior Knitting Machine Manufacturing Co., Allentown, Pa.
Hepworth & Co, Lehigh Ave. and Mascher St, Phila, Pa.
Jenckes, E. Mfg. Co, Pawtucket, R. I.
Jones, Lewis, 60 1-2 and Media Sts, Philadelphia, Pa.
Kennedy, Thos. (Cutters, etc.), Cohoes, N. Y.
Keystone Knitting Machine Mfg. Co, 40 No. 7th St, Philadelphia, Pa.
Lamb Mfg. Co., Chicopee Falls, Mass.
Leighton Machine Co, Manchester, N. H.
Little Hustler Napper Co., Hudson, N. Y.
Mayo Knitting Machine & Needle Co, Franklin, N. H.
McMichael & Wildman Mfg. Co, Norristown, Pa.
Mueller, A, 760 Lexington Ave, Brooklyn, N. Y.
Nye & Tredick, 606 Arch St, Phila, Pa.
Paxton & O'Neill, 127 Bread St, Phila, Pa.
Pepper Mfg. Co, Lakeport, N. H.
Scott & Williams, 2079 E. Cumberland St., Phila., Pa.
Stafford & Holt, Little Falls, N. Y.
Standard Machine Co., 508 Minor St., Philadelphia, Pa.
Taylor, James, 835 Arch St, Phila, Pa.

Knitting Needles and Supplies.

Breedon, Wm, & Son, Amsterdam, N. Y.
Cooper, Chas, Bennington, Vt.
Corey, Wm, Co, Manchester, N. H.
Crane Mfg. Co., Lakeport, N. H.
Dodge Needle Co., Manchester, N. H.
Goldstein, J. 416 Arch St., Philadelphia.
Ives, Loyal T, New Brunswick, N. J.
Keystone Knitting Machine Mfg. Co, 40 No. 7th St, Philadelphia, Pa.
Lydall, H, & Foulds, Manchester, Conn.
Manufacturers' Supplies Co., 66 No. 4th St., Philadelphia.
Mayo Knitting Machine & Needle Co, Franklin, N. H.
Page Needle Co, Chicopee Falls, Mass.
Treat, Orion, Manchester Green, Conn.
Wardwell Needle Co, Lakeport, N. H.

Laboratory Outfits.

Bullock & Crenshaw, 528 Arch St Phila, Pa.

Lamps, Electric.

Lynn Incandescent Lamp Co., Lynn, Mass.

Looms.

Crompton & Knowles Loom Works, Worcester, Mass.
Draper Company, Hopedale, Mass.
Fairmount Machine Works, 22d and Wood Sts. Philadelphia.
Furbush, M. A, & Son Co, Phila, Pa.
Howard, Geo. C., 1783 Barker St, Phila Pa. (For wire.)
Kilburn, Lincoln & Co, Fall River, Mass.
Lowell Machine Shop, Lowell, Mass.
Mason Machine Works, Taunton, Mass.
Whitin Machine Works, Whitinsville, Ms,
Woonsocket Machine & Press Co, Woonsocket, R. I.

Loom Picker Manufacturers.

Crompton & Knowles Loom Works, Worcester, Mass.
Loom Picker Co, Biddeford, Me.

Lubricators.

Dixon, Jos, Crucible Co, Jersey City, N. J.

Lumber.

Stearns, A. T, Lumber Co, Neponset, Mass.

Lumpers.

Gerry, George, & Son, Athol, Mass.

Machinery Dealers.

Jefferson, Ed, & Bro, 28 Strawberry St, Phila, Pa.

Machinists' Tools.

Blaisdell, P, & Co, Worcester, Mass.
Whiton, The D. E. Co, New London, Conn.

Mails.

Walder, J, Paterson, N. J.

Measuring and Folding Machines.

Curtis & Marble Machine Co, Worcester, Ms.
Elliott & Hall, 544 Hermon St, Worcester Mass.

Mills For Sale.

Denny, R. B., 143 Federal St., Boston.

Mill Builders and Engineers.

Berlin Iron Bridge Co, The, East Berlin, Ct
Ferguson, John W, Paterson, N. J.

Mill Supplies.

American Supply Co, Providence, R. I.
Bamford & Smith, Pascoag, R. I.
Bristol, The, Co., Waterbury, Conn.
Buckley's, Benj. Son, Gun Mill, Paterson, N. J.
Douglas Manufacturing Co., Fall River, Mass.
Harwood, Geo. S, & Son, 53 State St, Boston.
Hill, Jas, Mfg. Co. Providence, R. I.
Jefferson, Ed, & Bro, 28 Strawberry St, Phila, Pa.
Spofford, Wm. S, & Son, 5-11 Culver St, Providence, R. I.
Thurston, A. G, & Son, Fall River, Mass.
Watson, L. S, Mfg. Co, Leicester, Mass.

Napping Machines.

American Napping Machine Co, Williamstown, Mass
Ardrey, S. B, & Sons, Bristol, Pa.
Curtis & Marble Machine Co, Worcester, Mass.
Jones, Lewis, 60 1-2 and Media Sts., Philadelphia, Pa.
Little Hustler Napping Co, Hudson, N. Y.
Woonsocket Napping Machine Co, Woonsocket, R. I.

Novelties.

Stohn, C, 178 Green St, Jamaica Plain, Mass.

Pantagraphs for Mill Engraving.

Johnson, C. A, & Co, 22 Dey St, New York.

Patent Solicitors.

Crosby & Gregory, 24 School St, Boston, Mass.
Crossley & Goddard, 23 Court St, Boston.
Massink, H., Amsterdam, Holland.
Phillips & Anderson, 53 State St, Boston.
Wright, Brown & Quinby, 53 State St, Boston, Mass.

Penstocks.

Dalrymple, George, Fair Haven, Vt.

Perforated Copper

Beckley, A. J. & Co., Garwood, N. J.

Peroxide of Sodium.

Roessler & Hasslacher Chemical Co., 100 William St, New York.

Picker Sticks.

Loom Picker Co., Biddeford, Me.

Picking, Carbonizing and Garnetting.

Garfield Woolen Co, Garfield, N. J.
Kennebec Woolen Mills 2025 Naudain St., Philadelphia.

Pipe Covering (Magnesia).

Keasby, R. A. 54 Warren St, New York.
Keasby & Mattison Co, Ambler, Pa.
Nightingale, S. C, & Childs, Atlantic Ave Boston, Mass.

Pneumatic Conveying.

See Ventilating.

Power Transmitting Machinery.

Channon, H, Co, 25 Market St, Chicago, Ill.
Eastern Machinery Co, New Haven, Conn.
Fairmount Machine Works, 22d and Wood Sts, Philadelphia.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Hunt, C. W. Company, Staten Island, N. Y.
Hunter, Jas, Machine Co, No. Adams, Mass.
Jones, W. A, 53-59 South Jefferson Street, Chicago, Ill.

Kilburn, Lincoln & Co, Fall River, Mass.
Link Belt Machinery Co, Chicago, Ill.

Presses.

Crawford, J. J, & Son, Nashua, N. H. (Power Screw, Hydraulic, Hollow Steam Plate.)
Curtis & Marble Machine Co, Worcester, Ms.
Hart, Charles, Frankford, Philadelphia.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Hunt, C. W. Co, Staten Island, N. Y.
Phillips Co, The Thomas, Providence, R. I
Pownall, F. H, Iron Works, Jamesburg, N. J.
Sullivan Machinery Co., Claremont, N. H.
Woonsocket Machine & Press Co, Woonsocket, R. I.

Pressing Irons, Gas and Air Heated.

Sheftall, C. H, Mgr, 305-307 Mercer St, New York.

Printers and Embossers.

Novelty Textile Printing Co, 447-449 W. 14th St, New York.

Pumps.

Goulds Mfg. Co, Seneca Falls, N. Y.

Reed and Harness Manufacturers.

American Supply Co, Providence, R. I.
Loom Picker Co, Biddeford, Me.
Walder, J, Paterson, N. J.

Ribbons.

Cheney Bros, S. Manchester, Ct.

Roller Skins.

Fell, Geo, & Son, Bolton, England.

Roofing, Gravel, Slag and Composition.

Armitage Mfg. Co, Richmond, Va.
Johns, H. W., Mfg. Co., 100 William St. New York.
Warren Chemical & Mfg. Co, 45 Fulton St, New York.

Roofing, Paint and Paper.

Armitage Mfg. Co, Richmond, Va.

Roving Cans and Sheet Metal Work for Mills.

Hill, Jas, Mfg. Co, Providence, R. I.
Laminar, Fiore Co., No. Cambridge, Mass.
N. E. Ventilating & Heating Co, 930 Manton Ave, Providence, R. I.
Sullivan Machinery Co, Claremont, N. H.

Sample Cards.

Merchants Sample Card Co., 79 Crosby St., New York.
Yerrington, F. M, 17 Batterymarch Street, Boston.

Schools.

American Correspondence School of Textiles, Lowell, Mass.
Gavey Correspondence School of Textile Design. P. O. Box 222, Brooklyn, N. Y.
Lowell Textile School, Lowell, Mass.
Philadelphia Textile School, Phila, Pa.

Sewing Machines and Supplies.

Curtis & Marble Machine Co, Worcester, Mass.
Frame, Gibbons, 2nd and Diamond Sts, Phila, Pa.
Manufacturers' Supplies Co., 66 No. 4th St., Philadelphia.
Nye & Tredick, 606 Arch St, Phila, Pa.
Scott & Williams, 6th and Arch Sts, Phila, Pa.

Shearing Machinery.

See Dyeing, Drying, Bleaching and Finishing.

Shell Rolls.

Cohoes Foundry & Mach. Co, Cohoes, N. Y.
Thurston, A. G, & Son, Box 528, Fall River, Mass.

Shoddies.

See Wool Shoddies.

Shuttles.

See Bobbins, Spools, Shuttles, Etc.

Silk Machinery.

Butterworth, H. W. Sons Co, Philadelphia.
Crompton & Knowles Loom Works, Worcester, Mass

Singe Plates.

Butterworth, H. W. Sons Co., Philadelphia.
New Bedford Copper Co, New Bedford, Ms.

Sizing, Starch and Gums.

American Glutrose Works, Penn Mutual Bldg, Phila, Pa.
Columbia Mfg. Co, 143-151 Pocasset St, Fall River, Mass.
Stein, Hirsch & Co, 165 Duane St, New York.

Slashers.

Cohoes Foundry & Machine Co, Cohoes, N. Y.
Lowell Machine Shop, Lowell, Mass.
Phillips Co, The Thomas, Providence, R. I.

Soaps.

Holbrook Manufacturing Co., New York.
India Alkali Works, Boston, Mass.

Spindles.

Buckley, Benj's, Sons, Gun Mill, Paterson, N. J.
Draper Company, Hopedale, Mass.
Ward & Vandegrift, Elmer, N. J.
Whitin Machine Wks, Whitinsville, Mass.

Spindle Tubes.

Bamford & Smith, Pascoag, R. I.

Spinning Cylinders.

Hill, Jas, Mfg. Co, Providence, R. I.
N. E. Ventilating & Heating Co, 930 Manton Ave, Providence, R. I.

Spinning Frames.

See Cotton Machinery.

Spinning Frames for Wool

Woonsocket Machine and Press Co., Woonsocket, R. I.

Spinning Rings.

Draper Company, Hopedale, Mass.
Whitinsville Spinning Ring Co, Whitinsville, Mass.

Spinning Tubes.

Buckley, Benj's. Son, Gun Mill, Paterson, N. J.

Steam Boilers.

Brown, C. H, & Co, Fitchburg, Mass.

Steam Boiler Insurance.

Hartford Steam Boiler Inspection & Insurance Co, Hartford, Conn.
Mutual Boiler Insurance Co, 31 Milk St, Boston.

Steam Engines.

Brown, C. H, & Co, Fitchburg, Mass.
Hooven (The), Owens & Reutschler Co, Hamilton, O.

Steam Specialties.

Butterworth, H. W. Sons Co., Philadelphia.

Steam Traps.

Haines, W. S. C 136 South 4th St, Phila, Pa.

Tanks, Tubs and Vats.

Caldwell Co., W. E. 202 Brook St., Louisville, Ky.
Challenge Wind Mill & Feed Mill Co, 195 High St, Boston, Mass.
Corcoran, A. J, 11 John St, New York.
Cypress Lumber Co, Apalachicola, Fla.
Stearns, A. T, Lumber Co, Neponset, Mass.
Woolford, George, 2240 No. 9th St, Phila, Pa

Tapes, Braids and Edgings.

Friedberger & Co, Germantown, Pa.
Goff, D. & Sons, Powtucket, R. I.
Krout & Fite Mfg. Co., Allegheny Ave. and Emerald St., Philadelphia.
Weimar Bros, 1817 East York St, Phila, Pa.
Young, Wm. M, 3638-40 Frankford Ave, Philadelphia, Pa.

Temperature Regulators.

Haines, W. S. C, 136 South 4th St, Phila, Pa.

Tentering Machines.

See Dyeing, Bleaching Machinery, Etc.

Tension Pulleys.

N. E. Ventilating & Heating Co, 930 Manton Ave, Providence, R. I.

Testing Machines.

Howard, Geo. C., 1783 Barker St., Phila., Pa

Towers.
Caldwell Co., W. E. 202 Brook St., Louisville, Ky.
Challenge Wind Mill & Feed Mill Co, Boston, Mass.

Traveler's Cheques.
American Express Company.

Turbines.
(See Water Wheels.)

Ventilating Apparatus.
Allington & Curtis Mfg. Co, Saginaw, Mich., and East Cambridge, Mass.
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Massachusetts Fan Company, Room 641, 53 State St, Boston.
New England Ventilating & Heating Co, Providence, R. I.
Philadelphia Textile Machinery Co, Hancock St, above Lehigh Ave, Phila, Pa.
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Sturtevant, B. F. Co, 34 Oliver St, Boston, Mass.

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Hunt, Rodney, Machine Co, Orange, Mass.
Hunter, Jas, Machine Co, No. Adams, Mass.
Phillips Co, The Thomas, Providence, R. I.

Watches and Clocks.
Elgin National Watch Co., Elgin, Ill.

Watchman's Clock.
Eco Magneto Clock Co, 620 Atlantic Ave, Boston.
Nanz & Co, 116A Chambers St, New York.

Water Wheels.
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Wool.
Lyon, John H, & Co, 12 Reade St, N. Y.

Wool Cleaning Compound.
India Alkali Works, Boston.

Wool Combing Machinery.
Crabb, Wm. & Co, Newark, N. J.
Crompton & Knowles Loom Works, Worcester, Mass.
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Wool Extracts.
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Wool and Waste Dusters.
Gerry, Geo, & Son, Athol, Mass.
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Stillman-Randall Machine Co, Westerly, R. I.

Woolen and Worsted Machinery.
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Curtis & Marble Machine Co, Worcester, Mass.
Fairmount Machine Works, 22d and Wood Sts, Philadelphia.
Furbush, M. A. & Son Machine Co, Phila, Pa.
Harwood, Geo. S, & Son, 53 State St, Boston.
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Jefferson, Ed, & Bro, 28 Strawberry St, Phila, Pa.
Philadelphia Textile Machinery Co., Hancock and Somerset Sts., Philadelphia.
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Stoddard, Haserick, Richards & Co, Boston, Mass.
Woonsocket Machine & Press Co Woonsocket, R. I.
Woonsocket Napping Machine Co., Woonsocket, R. I.

Wool, Hair and Noils.
Becker, Chas. W, Agt, Amsterdam, N. Y.
Fowles & Co, 106 Church St, Phila.

Wool Shuddies.
Barnett, William, 164 Broadway, Albany N. Y.
Becker, Chas. W, Agt, Amsterdam, N. Y.
Garfield Woolen Co, Garfield, N. J.
Kennebec Woolen Mills, 2025 Naudain St, Philadelphia.
Riverdale Woolen Co, Riverdale, Northbridge, Mass.

Wool Sorters and Scourers.
Kennebec Woolen Mills, 2025 Naudain St, Philadelphia.

Wool Washing, Preparing and Drying Machinery.
Phillips Co, The Thomas, Providence, R. I.
Sargent's, C. G, Sons, Graniteville, Mass.

Yarns, Threads, Etc.

Banding.

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Solis, Andrew J, Jr, & Co, 179 Devonshire St, Boston, Mass.
Tucker & Cook Mfg. Co, Conway, Mass.
Whittier Cotton Mills, Lowell, Mass.

Cotton Yarns.

American Spinners' Cotton Yarn Exchange, 45 Milk St, Boston.
Burnet & Co., 24 George Sq., Glasgow, Scotland.
Catlin & Co, New York and Boston.
Clark, Wm, Co, Westerly, R. I.
Cohannet Mills, Taunton, Mass.
Dana Warp Mill, Westbrook, Me.
Eddy & Street, Providence, R. I.
Eichmann & Sternberg, 530 Broadway, cor. Spring St., N. Y.
Fleming & Chapin, Philadelphia.
Germantown Spinning Co, Germantown, Pa.
Grant Yarn Co, Fitchburg, Mass.
Greene & Daniels Mfg. Co, Pawtucket, R. I.
Hadley Co, Holyoke, Mass.
Hawes, O. S, & Bro, Fall River, Mass.
Indian Orchard Co., Indian Orchard, Mass.
Jenckes, E., Mfg. Co., Pawtucket, R. I.
King, Alex, & Co, 54 Leonard St, New York City.
Mitchell, Jas. E, & Co, Boston and Phila, Pa.
Montgomery, J. R, Co, Windsor Locks, Ct.
Monument Mills, Housatonic, Mass.
Orswell Mills, Fitchburg, Mass.
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Tucker & Cook Mfg. Co, Conway, Mass.
Whittier Cotton Mills, Lowell, Mass.

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Campbell, Geo, & Co, Phila, Pa.
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New England Thread Co, Pawtucket, R. I.
Orswell Mills, Fitchburg, Mass.
Rockwell, E. M, Leominster, Mass.
Sanford Spinning Co, Fall River, Mass.
Shimer, Geo, & Son, 5th and Erie Sts, Camden, N. J.
Skerry, A T, & Co, 47 Leonard St, N. Y.
Walcott & Campbell Spinning Co, New York Mills, Oneida Co, N. Y.
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Whittier Cotton Mills, Lowell, Mass.

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Fawcett, Hughes, 115 Franklin St., N. Y
Holland & Webb, N. Y.

Mohair Yarns.

Eichmann & Sternberg, 530 Broadway, cor Spring St., N. Y.
Goff, D. & Sons, Pawtucket, R. I.
Skerry, A. T, & Co, 47 Leonard St, N. Y.

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Cranston Worsted Mills, Bristol, R. I
Eichmann & Sternberg, New York City.
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Montgomery & Co, J. R, Windsor Locks, Ct.
Skerry, A. T, & Co, 47 Leonard St, N. Y.

Silk Yarns.

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Eichmann & Sternberg, 530 Broadway, cor. Spring St , N. Y.
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Rockwell, Edward M, Leominster, Mass.
Skerry, A. T, & Co, 47 Leonard St, N. Y.
Solis, Andrew J, Jr, & Co, 179 Devonshire St, Boston, Mass.

Worsted Yarns.

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Botany Worsted Mills, Passaic, N. J.
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Campbell, Geo, & Co, Phila, Pa.
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1159 **Woolen Superintendent.** A first class man on carriage robes, furniture plush, bed and horse blankets. Has excellent references. Has held present position as superintendent for several years; good reasons for desiring a change. Age 39; married.

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1180 Wants position as 2nd h nd of carding in woolen or knit mill. Age 23; single. Has been successful in like position. Prefers position in Mass., R. I., Conn., N. H., Penn., N. Y. or N. J. References if required.

1233 **Felt** Overseer of Carding. A good man on felt or woolen goods. Aged 35; married. Can refer to past employers.

1249 **Carder and Spinner,** woolen, wants position. Familiar with a great variety of goods. 37 and married.

1248 **Carder,** woolen. Age 37 years; married. 10 years with one of the best mills in New England. Dress goods, beavers, blankets, cotton warp hair lines and kerseys.

1270 **A 1 Carder,** wool or cotton, 11 years experience, first-class references, reliable, temperate and industrious, desires immediate position. Age 30. Will go any where.

1307 **Carder** with unusually fine record and very wide experience desires good position in New England, Central or Western States. First-class references from past positions. Age 44. Experience on cassimeres, cheviots, dress goods, broad-cloth, repellants and blankets.

1378 **Overseer Woolen Carding.** American, age 32, married. With one mill 13 years, and another 4 years. Excellent references from each. A first-class carder in every way.

COTTON CARDERS.

1430 **Cotton Carder** just out of work because of mill closing indefinitely Has had long experience in Conn. and Mass. mills, and refers to past employers. Can undoubtedly give satisfaction on any kind of goods.

1432 **Overseer Cotton Carding.** This man has worked up from sweeping boy to overseer in the same mill and we have a letter from the former manager expressing the highest regard for his ability and character. Age 30, Married.

423 **Cotton Carder or Supt.** At present in the South but desires to return to the North. Early training and most of his experience was in N. E. mills. Understands combing. Age 38. Married.

1368 **Overseer on Second-Hand Cotton** Carding wants a position in small room at $2.50 per day or upwards. Will do his own grinding. Or, would take a first-class second hand job. Last five years in one place. Thoroughly practical and understands all the machinery in the card room. Age 37; married. Good reference. Prefers New England.

WOOLEN SPINNERS.

1299 Woolen Spinner who has had experience as second-hand would like a position as boss spinner. Would accept small salary to start. Has worked on cloakings, dress goods and Scotch tweeds in New England mill.

1287 **Young Man** wants position as boss spinner. Experience in first-class mills on cassimeres, kerseys, cheviots, satinets; knows Davis & Furber, Paul and Johnson & Bassett machines. Age 29. Wife works in mill.

1195 **Spinner, Woolen.** American; age 31; married. Experienced on yarns from 1 to 7 1-2 run. Refers to past and present employers. Wants position as overseer. Will not go to Southern States, Canada or Connecticut. Is an experienced overseer.

1374 **Overseer Woolen Spinning.** All makes of mules, has had charge in good mills. Experience covers yarns for hosiery, fancy woolens and worsteds. Age 28; married.

1111 **Overseer of Spinning** wants position. Age 48 and married. Has good recommendations from last employers. Has worked on cassimeres, wool shoddy, fancy elderwown and flannels. Will go anywhere.

1204 **Situation wanted** as boss spinner, or second hand and mule fixer on Plain mules. Many years experience on yarns for dress goods in England, and also yarns for fine woolen cloth. 35 years old and married; good references.

1316 **Overseer Worsted Drawing** and spinning. Will accept first class position at $3 or more per day. At present employed in well known and first class mill. Age 42. Married. Best references from former employers.

COTTON SPINNERS.

1424 **Overseer, Spinning.** Mules preferred. At present employed in N. B. mill. Has held position as overseer 6 years. Single. Will go anywhere.

1407 **Cotton Frame Spinner** now in charge of nearly 30,000 spindles in a Southern mill wants to return north. First-class reference both north and south where he has worked. Age 30. Married. American.

1438 **Cotton Mule Spinner** who has worked on plain white goods only desires to secure a permanent position in the Eastern or Central states. Has good references and is perfectly reliable. Age 45. Married.

1429 **Cotton Ring Spinner** who has been overseer 5 years and second hand 8 years. Worked on white and colored yarns, spooled and twisted. Refers to past employers in Maine and Mass. Age 36. Married.

1350 **First-Class Ring Spinning** overseer, also spooling, warping, slashing, web drawing; large experience, highest references as to skill, character and executive ability. At present employed in Fall River. Age 48, American.

1198 **Cotton Spinner,** spooling, warping, slashing, web drawing, skein winding and quilting on linen. Well recommended. Age 42; married. Has worked in some of the best mills. Will go anywhere. Would accept a good second hand's position.

WOOLEN WEAVERS.

1433 **Overseer Woolen Weaving.** More than 18 years' experience in large mills in Canada and the States. He is highly recommended for position of boss weaver or assistant superintendent. Experience covers a large variety of cloths on Crompton & Knowles looms. Age 36. Married.

1434 **Boss Weaver, Woolens.** Wants a job in a large mill and can handle same in good shape. Age 36. Married. Has made fancy worsteds, fancy cassimeres, meltons, dress goods, etc.

1340 **Worsted Weaver** would like position in a small mill at moderate salary; experience as fixer and in cloth room. Age 38, married. Knowles and Crompton looms; references good.

1008 **Wants boss job in flannel mill.** Northern New England preferred, also a good man for dresser or fixer, has worked on flannels, serges, cheviots, fancy dress goods. Is 34, married.

1385 **Worsted or Woolen Weaver** of fancy worsted and woolen mens' wear and novelty dress goods. Has held positions in leading N. E. and Phila. mills. Expert on Crompton & Knowles looms: Best references. Age 38; married. Can start at once.

1313 **Woolen Weaver.** First class references, and experience on fancy cassimeres, kerseys, beavers, dress goods, etc. At present not employed, for good reasons. Age 44. Married.

140 **Worsted Weaving Overseer** with 12 years' experience as overseer, designer, and superintendent. Has tried another business for a few months and now wants to go back to the mill. Excellent references, habits all right. A skillful weaver and manager. Age 33, married, American.

COTTON WEAVERS.

1242 **Overseer Cotton Weaving.** Familiar with plain cloths, sateens, fancy checks and stripes, box looms and dobbies. References. Age 43; married. One weaver, one twister in family.

1425 **Overseer, Cotton Weaving.** Age 38. Married. At present employed in large Mass. mill where he has been for 7 years as overseer. Worked on all kinds of goods and is well experienced. American. Refers to past and present employers.

1380 **Overseer Cotton Weaving.** Held overseer's position for 5 years in Mass. mill, but now out because of change in management. A man of well-known ability. Age 48; married, American. One of the best weavers in New England. Will go South to a good position.

1373 **Overseer Cotton Weaving.** A man with especially good opportunities to gain wide experience in large Mass. mills; now second hand, having worked up from band boy. American, age 29, married; best of references.

1226 **Overseer of Cotton Weaving.** Age 30; married. Accustomed to sheetings, shirtings, twills, drills, fancies and quilts. Can take place at once. Refers to present and past employers.

1353 **Overseer Cotton Weaving,** who has worked up from fixer to overseer in good mills, wants position paying $3.00 or more. Scotch, age 29; experience on all kinds sheetings and sateens.

1334 **Jacquard and Dobby Weaver** and designer on Knowles machines. 8 years' experience in this position. At present employed and can furnish excellent references. Age 38; married.

DYERS.

1415 **Dyer.** Now out of work on account of the mill being stopped. Aged 30, and married. Will start for small pay. Accustomed to Beavers, Broad and Carriage cloths, Repellents, fancy Cassimeres, Raw Wool and Cotton, light shades or piece dyes. Refers to past employers.

1346 **Chemist or Salesman.** Graduate Crefeld Textile School, colorist for German manufacturers, and since employed for 3 years in this country as colorist. Young man, single.

1420 **Dyer.** 22 years experience dyeing wool and Cotton Hosiery. A first-class man.

1426 **Dyer,** silk or cotton. Age 45. Married. Italian. Learned trade in France. Has worked 23 years in this country in good mill Refers to past employers.

1427 **Second Hand Cotton Piece** Dyer. Age 38. Married. Worked on canton flannels, sateens, drills, ducks and all kinds cotton piece goods. Was 12 years in one mill as second hand. At present employed but can leave at once. Well recommended.

1327 **Skillful Dyer** with experience on raw cotton and wool, indigo blue vats, slubbing, worsted and woolen yarn, piece dyeing on ladies' dress goods and men's suitings. Age 45; married. First class references from good mills.

1355 **Wool and worsted Dyer,** a young man with 5 years' training by one of the best dyers at one of the largest mills in N. E. Experience on worsted and woolen cheviots, clays, worsteds, suitings, cloakings, beavers, dress goods, carriage cloths, yarn, slubbing, wool. Now boss dyer. Good reasons for desiring a change.

1292 **Woolen Dyer** with experience also in mixes, piece dyes, rags, hosiery, black cotton, waste and shoddy. Has held boss job several years. Age 34; married. Very good references.

FINISHERS.

1428 **Overseer of Napping.** Young man just out of position because his mill stopped making fleece lined underwear. Experience on French machines and Davis & Furber cloth and knit nappers. Can refer to leading Mass. mill men for whom he has worked. Will go west. Single.

1359 **Woolen Finisher** of all kinds of woolen goods; 20 years in charge, at three leading mills. At present out of employment; expects $4.00 a day. Age 45, married; references first class.

1330 **Expert Finisher** with 10 years' experience in European mills. Can do perfect work on highest grade cassimeres, serges, cheviots, kerseys, worsteds, astrachans. Age 34; married. German, speaks English imperfectly.

1437 **Finisher** wants to change present job for one paying $2.50 or more. Has had a wide experience for a young man. Has worked on many kinds of machines and has good references. Single. Age 30.

228 **Worsted or Woolen Finisher.** One of the best men in the country. Age 38; married. English. Has had charge of the leading mills in this country. His experience covers woolen and worsted men's wear, also ladies' dress goods, overcoatings, cloaking, etc. Understands the new German finish applicable for dress goods up to eight ounces. By stiffening on the back this finish makes single warp filling goods equal to two-ply.

KNITTERS.

1435 **Boss Knitter.** Underwear, astrakhans, stockinet, rubber linings, etc. Efficient workman on circular spring needle machine. Age 36. Married.

1317 **Knitting Overseer.** Wide experience. Age 36. Married. Has worked on fleece lined underwear, elder downs, stockinet, jerseys, etc. Familiar with spring needle circular machines. First class references.

1274 **Hosiery** superintendent wants position; married. Long experience on men's, women's and children's woolen hosiery.

1405 **Boss Knitter.** Young man with good knowledge of knit goods. Al on circular ribbers. Thoroughly experienced on mittens, leggings and golf hose. owns 3 machines. Can bring best of references from large concerns. Desires position with good house.

1410 **Knitting Machine Fixer.** Young man who wants to gain large experience in this line desires a position in the Eastern or Central states. Is expert on many kinds of machines. Leggings, bicycle hose, gloves, mittens, etc. Highly recommended as to character and ability.

1362 **Boss Rib Knitter,** young man, now second hand in fleece lined underwear mill in New York State wants to advance. Very highly spoken of by present employers as to both ability and character. Could change on short notice.

1342 **Hosiery or Underwear Supt.** A practical knitter familiar with latch, spring needle, and sewing machines; nearly 15 years superintendent of New England hosiery mill, at present shut down. Good manager; references first-class. Age 47; married.

DESIGNERS.

1431 **Woolen Designer or Superintendent.** Young man, at present employed, desires to secure a position as above. Has been assistant superintendent of 18 set mill making fancy cassimeres and worsteds. Single. References show him to be a man of good ability.

1259 **Color Designer** or Woolen Superintendent. Age 39. Good, steady reliable man. Refers to past employers.

1411 **Assistant Supt. or Designer** desires position. Thoroughly practical, having had experience from picker to loom in one of the best N. E. mills. Has designed both single and double cloths in cotton, woolen, worsted and silk. Good references.

1259 **Woolen Designer or Supt.,** 10 years' experience on meltons, kerseys, beavers, and dress goods. Thorough knowledge of color mixing and picking out. Best of references from past positions. Age 38, single.

1397 **Cotton Designer or Weaver.** A young man with unusual opportunities and experience in England, now holding a position in a leading mill in Connecticut, desires to advance. Refers to several prominent mill men and would make a progressive designer for a mill running on Jacquards, Lappet or Lenos.

1275 **Designer** or assistant. Age 25; married. A good man on cotton or worsted fancy dress goods. Jacquard and box looms.

1151 **Asst. Superintendent or Designer** wants position. Age 33; married. Worked on cloakings, fancy worsteds, cheviots, dress goods and cassimeres. Can refer to past employers.

MISCELLANEOUS.

1436 **Boss Dresser.** At present out of work because mill is running slack. Experience covers a large line of goods on D. & F. and Cleveland machines. Would start at $2.25 a day if work was steady. Age 26. Single. A very reliable young man.

1255 **Felts.** The advertiser has a thorough, practical knowledge of all the details connected with the manufacture of paper makers' felts and jackets; especially adapted for fast running machines; good reason why he is now in the market; recommended by past employers.

1282 Foreman Roller Covering and Belts seven years, and four years foreman in large mills. Excellent references. A reliable young man.

1229 **Dresser.** Overseer of woolen dressing. Age 30. Men's wear and dress goods. Good references.

1228 **Shearer.** Wants position as overseer of shearing. Good man on cassimeres, worsteds, unions and cheviots. Age 25; married. References.

1301 **Book-keeper and Paymaster.** Young man of the very highest character desires to move away from the Atlantic coast, on account of his health. Best references from his present and former employers.

1393 **Practical Chemist.** Experience covers three years in English and German textile schools and 17 years in New England mills, bleacheries and print works. Has practical knowledge of all departments of a bleachery, and would accept position in the South. Age 39; married; American.

1381 **Cloth Examiner.** Worsteds or woolens. German, age 30, single. Man of high character, 9 years in one of the leading N. E. mills and also in large N. Y. clothing houses. Best of references.

1395 **Overseer of Slashing, Spooling,** warping and drawing, a man who thoroughly understands his business and has excellent habits, well recommended from leading mills. Age 42; married.

1379 **Overseer, Cloth Room.** Out of work because of change in management. A man with first-class record and wide experience. Refers to several prominent mill men. Age 39; married, American.

1335 **Loom Fixer or Second Hand.** Knowles and Crompton looms, fancy worsteds and cassimeres, dress goods. German; Protestant; age 37, married. Has been employed in good mills and is very well recommended.

1372 **Wool Sorter.** Young man with excellent training in R. I. mill. Will start at $2.00 a day. Refers to past employers.

1363 **Twisting, Spooling, Warping** overseer. Experience on single and twisted yarns up to 2/100s in one of the best New England mills. Now employed as assistant; young man, but is confident that he could satisfactorily fill overseer position.

1399 **Master Mechanic** with experience from bench work up to foreman. Has worked in cotton mill and cotton machinery works. First-class workman. Can get the best results from power plant and machinery.

1404 **Chief Engineer and Machinist.** A man who is fitted by education and experienc to take charge of a large plant. Well acquainted with all kinds of mill machinery. Has hadcharge of erection of steam, water and electrical plants, pumping machinery and cotton mill equipment. Would be an excellent man to superintend the erection of a new plant and economical operation of same.

Patents.

(Continued from page 22.)

Knitted Garment Blank. 609,694. D. McGenniss, Easthampton, Mass., assignor of one-half to Oren C. Burt, same place.

Knitting Machine, Burr-Holder Attachment. 609,594. H. V. H. Smith, Norfolk, Va., assignor to Tompkins, Brothers, Troy, N. Y.

Knitting-Machine Needle. 609,586. S. Woodward, Manchester, N. H.

Loom for Weaving Fringes. 610,391. J. Ferguson, Dundee, Scotland.

Loom for Weaving Tufted Fabrics. 609,638. E. Tymeson, Yonkers, N. Y., assignor to the Alexander Smith & Sons Carpet Co., same place.

Loom for Weaving Looped-pile Fabrics. 610,563. G. H. Sargent, R. H. Coupe, and Benjamin Walker, Bingley, England.

Loom Take-up Mechanism. 610,636. J. H. Northrop, Hopedale, Mass., assignor to the Draper Co., same place and Portland, Me.

Looms, Knife-sled Motion for Plush or Velvet. 610,711. John Killars, Stonington, Conn.

Loom Reed. 610,011. E. Adamson, Pawtucket, R. I., assignor to the Excelsior Loom Reed Works, Incorp., same place.

Mercerizing Apparatus. 610,619. A. Wyser, Aarau, Switzerland.

Spindles, Apparatus for Applying Cop-tubes to. 610,605. Eduard Herzog, Erlach, Austria-Hungary.

Spinning Machine Twist Indicator. 610,552. J. T. Meats and T. W. Dean, Taunton, Mass., assignors to the Mason Machine Works, same place.

Spindle and Bearing. 609,757. G. O. Draper, Hopedale, Mass., assignor to the Draper Co., same place and Portland, Me.

Spindle and Bearing. 609,758. G. O. Draper, Hopedale, Mass., assignor to the Draper Co., same place and Portland, Me.

Spindle and Bearing. 609,759. G. O. Draper, Hopedale, Mass., assignor to the Draper Co., same place and Portland, Me.

Spindle and Bearing. 609,760. G. O. Draper, Hopedale, Mass., assignor to the Draper Co., same place and Portland, Me.

Spinning and Doubling Frame, Ring. 610,106. G. H. and W. Thompson, Rochdale, Shaw, England.

Spooling or Quilling Machine, Thread. 610,162. R. Atherton, Paterson, N. J.

Tubular Woven Fabric. 610,462. B. L. Stowe, Jersey City, N. J.

Tubular Woven Fabric. 610,463. B. L. Stowe, Jersey City, N. J.

Tentering Machine. 609,574. F. I. Dana, Providence, R. I., assignor to the Thomas Phillips Co., same place.

Wool, Gill-box for Preparing. 610,774. J. Smith and W. Holdsworth, Halifax, England.

Woven Fabric. 610,051. R. H. Hey, Philadelphia, Pa.

Weaving Needle. 609,450. E. Morris, Michigan City, Ind.

Weaving Thread. 609,451. E. Morris, Michigan City, Ind.

Facts and Gossip.

—Pennsylvania, Chester. The parties represented by A. B. Geary, who purchased the Paterson Mills plant at sheriff's sale, a few weeks ago, have defaulted in payment of the purchase money and the cash deposit has been forfeited. The sheriff seized the property and in due time it will be sold again.

—Pennsylvania, Parker's Ford. It is reported that Wismer, Heistand, Booth & Co., Ltd., manufacturers of seamless hosiery, will remove their plant to Pottstown, Pa. They have at present 12 knitting machines. Arthur Booth is superintendent; H. Heistand, treasurer.

—Pennsylvania, Philadelphia. Judgment has been entered by the Franklinville Dye Works, Ltd., against Robert Blood on a judgment note for $4,000.

—Pennsylvania, Pottstown. Wismer, Heistand, Booth & Co., Ltd., confirm our recent report of their removal to this place from Parkerford. They will have 30 knitting machines and employ 75 hands. A new building will be put up.

—Pennsylvania, Pottstown. We have previously reported that Wismer, Heistand, Booth & Co., Ltd., manufacturers of seamless hosiery, were to remove to this place from Parkerford. This is now confirmed by their purchase of a lot on which building will be erected at once, 30x50, two stories high.

—Pennsylvania, Quakertown. The mill of the Eagle Silk Co., at this place, was sold on Aug. 29th, to Charles Poe, for $670. This includes t two-story brick building, 45x120, steam plant, dynamo, 49 silk looms and 9 carding machines.

—Pennsylvania, Philadelphia. The Phoenix Mills Co., of Chester, have bought, through Edward Jefferson & Bro., the carding and combing machinery formerly operated by the Bridge Mills by Lobley & Alberzetti. Drawing and spinning remains at the Bridge Mills and has been bought by Mrs. Sarah Humphreys, who will operate the plant in its present location.

—Pennsylvania, Philadelphia. J. Whittle retires from the firm of Whittle & Leavers, 2509 Knorr St. Mr. Leavers will continue the manufacture of cotton hosiery in a new location on Girard Avenue, west of Seventh.

—Pennsylvania, Philadelphia. The machinery business of J. K. Lamb has been incorporated under the laws of New Jersey with a paid-up capital of $10,000. The name of the concern will be J. K. Lamb Textile Co.

—Pennsylvania, South Easton. At a meeting of the stockholders of the Phillipsburg Silk Mill Co., of Phillipsburg, N. J., held Aug. 30th, it was decided by a vote of 9655 to 50 to move the plant to South Easton and that a building be erected for the purpose with money subscribed by residents of Easton and South Easton. After the meeting a number of stockholders, who are opposed to the removal of the mill, decided to hold a meeting to arrange for making application for an injunction to restrain their moving away from Phillipsburg, as the stock was subscribed by Phillipsburg parties with the understanding that the mill would be located at that place.

TEXTILE DESIGN

TAUGHT BY CORRESPONDENCE.

Send for Prospectus.

GAVEY CORRESPONDENCE SCHOOL OF TEXTILE DESIGN,

P. O. Box 222. Brooklyn, N. Y.

FOR SALE.

On Nov. 9, 1898, at noon, all the Real Estate and Machinery of the Peabody Mills, Newburyport, Mass., unless previously disposed of, consisting of 116,112 sq. ft. of land, situated on Federal and Water Streets, with buildings all of brick in good condition, with a floor space of about 110,000 sq. ft., not including store houses, etc., and containing 34,000 spindles, 768 looms, with steam power and all the necessary machinery for the manufacturing of cotton cloth, all in excellent order. For further information, apply at 78 Chauncy St., Room 55, Boston, or upon the premises.

Underwear Finisher.

WANTED:—A finisher for woolen and worsted underwear. Must have special experience in wet finishing and tinting. Address, Inf. Dept., Textile World.

Hosiery Finisher.

WANTED:—A finisher for a hosiery mill in the west. Address, Inf. Dept., Textile World.

Hosiery Machine Fixer.

WANTED:—A machine fixer for a seamless hosiery mill Pay $2 per day. Address, Inf. Dept., Textile World

Hosiery Mill For Sale or To Let!

A new plant, capacity 100 dozen per day.

Water Power To Let, 400 H. P., with excellent buildings.

W. K. DANA, Westbrook, Maine.

Expert German Finisher Wanted.

A man who is thoroughly acquainted with German finishing machinery and German finishing methods. Prefer one with a thorough knowledge of machinery. One who can operate as well as design and furnish information. Address in confidence,

G. F. care of Textile World.

Position Wanted by Chemist.

Young man, college graduate, and has and experience as assistant superintendent of bleaching, printing and dyeing. Address P. 166, care of Textile World.

MULE FITTER

Wants a position to set up or repair cotton and woolen mules. Address, P, 167, care Textile World.

WOR. SPINNING RING CO.

WORCESTER, MASS.

Facts and Gossip.

—Rhode Island, Mapleville. The Mapleville Mill property has been sold at auction to Wm. Legg, agent, for $25,000. The only other bidder was Mr. Lester of the Centredale Worsted Mills. The property has been idle since the fire in April. Before that it was operated by the Mapleville Woolen Co., in which Joshua Perkins, William Legg and others were interested. The property consists of 6 set mill, 100 acres of land, a number of dwellings, tenement houses, etc., and price paid was very low. There was a mortgage of $19,000 on the property.

—South Carolina, Clemson College. J. H. M. Beaty has been appointed head of the textile department of Clemson College. Mr. Beaty has lately been superintendent of the Norris Cotton Mills, Cateechee, S. C. and formerly of the Catawba Mills at Chester. He is a Southerner by birth and education and has had good technical and mechanical training, and ought to be a good man for the place.

—South Carolina, Whitney. Increase in capital stock of the Whitney Mfg. Co. from $190,000 to $266,000 was made March 1st, 1898, but the company informs us that an addition is not contemplated now. The mill now contains 17,440 spindles and 674 looms.

The Administrators of the Estate of
Edward C. Thayer offer

FOR SALE THE FOLLOWING PROPERTY

In Ashuelot and Winchester, New Hampshire.

Mill No 1.

Mill No. 1—Main building 164x40 feet, brick, four stories; ell 84x28 feet, wood, three stories, dry finishing room and machine shop 116x20, brick; engine room, blacksmith shop and steam gig room 40x24, brick; dye house and drying room, 80x36, brick. All the above rooms are connected and contain the following machinery: Nine sets of cards 48-inch Lombard make; two sets cards 48-inch Cleveland make; finishers of cards all 60 stands; the best improved apron condensers, Davis & Furber and Barker make; clothing all in good condition and best quality. The first breakers are all equipped with Bramwell feeds, mostly new, two traverse and one cylinder grinder.

Spinning Room. Nine Davis & Furber self-operating 300-spindle each mules; two mules, Johnson & Bassett make, 400 spindles each.

Weave Room. Fifty-six full fancy Crompton looms and one pattern loom.

Finishing Room. Two finishing shears, Parks & Woolson make; two cropping shears, Parks & Woolson make; six fulling mills, Orange make; two fulling mills, flange rollers, Adams make; four washers, four strings each, Orange make; eight single-acting gigs, four double-acting gigs; one net gig and two steam gigs, Orange make; one cylinder press, Woonsocket make; one cloth-measuring machine, Windle make; one folding and rolling machine, Windle make; two brushes.

One engine, Corliss make, 80 H.P.; machine shop, with turning lathe and blacksmith shop, all complete. Above machinery operated by two independent water wheels, one six feet in diameter and one five feet in diameter.

Dye House (Brick). Five coloring kettles; three four-string washers with ventilating fan; two extractors, Boston Tool Co. make, all complete; extra four-foot Hunt wheel. Picker house (wood) 40x24, three pickers, one lumper, two dusters, extra four-foot Hunt wheel. Carpenter shop (wood) 40x30, two stories, equipped with planers, jointer, bench and swing saws and extra wheel. Boiler house (brick) 48x30, three boilers, one five-foot steel almost new, two four-foot tubular, all Cambridge make. Store house (brick) 100x40, four stories. Dressing room, three dressing machines, four spooling machines, all Cleveland make. Office (brick) 34x20. Store (wood) 100x26. Storehouse near railroad, 90x30. One brick boarding house, furnished; one four-tenement brick block; one four-tenement wooden block; nice residence for superintendent; 20 houses containing 38 tenements; two wood lots, one mowing and one pasture. Also dam, water privilege connected therewith, grist mill and blacksmith shop in Winchester. All above machinery in excellent condition.

Mill No. 2

Mill No. 2. Main building (wood) 82x25, two and one-half stories, containing four sets machinery; lap cards, three sets, Lombard make, one set Cleveland make; forty-eight inch breakers and forty-inch finishers. Spinning capacity five self-operating spinning frames, Johnson & Bassett attachment; three 240-spindle frames and two 200-spindle frames. Finishing room (wood) 40x35 feet, two stories, contains one finishing shear, one cropping shear, one brush, one cylinder press, seven gigs, three fulling mills, two two-string washers, one four-foot Hunt water wheel and one four-foot tubular boiler. Picker house (brick) 46x26. One Kitson picker, one lumper, one duster. Office, 20x20; storehouse, 50x20; one boarding house; five tenement houses, containing eight tenements; weave room with 25 plain looms, Davis & Furber make. Plant for gas lighting, Springfield make; electric clock system for watchman; four writing desks in office; one set of hay scales, Fairbanks make, sprinklers and all fire apparatus in excellent condition. Further information will be furnished to parties desiring the same upon application to Rodney Wallace, Fitchburg, Mass., or A. T. Batchelder, Keene, N. H., administrators, and parties desiring may inspect the property, without conferring with the administrators, upon application to the party in charge of the mills at Ashuelot, N. H.

EDWARD JEFFERSON & BRO.,

Worsted .·. Machinery,

28 Strawberry Street,

PHILADELPHIA, - - PA.

SOLE AGENTS FOR

J. B. Farrar & Sons, Halifax, England,

Buggella Cork Rollers for Spinning and Drawing.

MACHINERY

Shafting, Hangers, Pulleys and Couplings. Machinery Steel in all sizes from 6 1-2 inches diameter down to 3-16 inch diameter, cut any length, always in stock. Cold Rolled Rounds, Squares, Flats, Hexagons, Octagons, Decagons, and all shapes finished to exact sizes. Everything in readiness to be shipped at once. Our goods are without a rival and our prices the lowest of all.

Telephone 314, South Boston.

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Highest References.

NEW PATTERNS

of all kinds of textile novelties (**French, English and German**) supplied by Senson's Subscription at moderate rates, or in single parcels of 100—300 new patterns assorted as required, for **$10 per parcel.** Address full particulars as to styles wanted to

A. SMITH, 89 Rue Turenne,

PARIS, FRANCE.

FOR SALE.

A seven set woolen yarn mill, situated at Braintree, ten miles from Boston, on the N. Y. N. H. & H. R. R. Steam and water power. Business established in 1831. Plant now running. For further particulars, inquire of

T. KING, Assignee,
28 Equitable Bldg. - - Boston.

DANIEL S. PRATT,

180 Summer Street, - BOSTON,

ROOM 24.

851 Calle Piedad, Buenos Aires.

SOUTH AMERICAN WOOLS,

..Personally Selected..

Graded to the Standard of U. S. Markets.

The Best is the Cheapest.

It is BETTER and CHEAPER to wind yarn by the "Universal" system before shipment from the mill, thus insuring perfect delivery to knitting machines without rewinding.

UNIVERSAL WINDING CO.,

F. H. BISHOP, Manager.

226 Devonshire St., - Boston, Mass.

WHERE? HOW? WHY? WHO?

Where can we get such a machine?

How can we produce that effect, or color, or fabric?

Why does this machine run badly, and what can I do to fix it?

Who makes such and such fabrics?

• • • •

Such questions and scores of similar ones are constantly arising, and our Questions and Answers Department undertakes to answer those relating to textile matters, free of any charge, to the best of its ability, and invites such correspondence from subscribers. Address the Boston office.

TEXTILE WORLD,
620 Atlantic Avenue, Boston.

YARN DEPARTMENT.

Eastern Yarn Market.

Cotton Yarn: Spinners are running on orders for heavy weights in 1/10s, 1/11s and 1/12s, mostly for heavy ribbed underwear. The ribbed work has run mostly on white yarn the past season. Plush underwear still holds its own although prices are very low. This work takes colored mixes for the surface and 1/8s to 1/6s for backing yarn. The yarn used is mostly single roving. Southern yarn, and prices are very low. The 2-ply trade is good in some sections and poor in others. The woolen mills in Pascoag, using this class of yarn, are buying very little. The light-weight underwear trade on balbriggan is about to start up and orders will be placed soon for 1/18s, 1/20s, and 1/24s. The knitters expect a good run and contracts will be placed in good amounts. This also applies to both balbriggans and to the ribbed mills which make light-weight garments. We note that the cop yarn knitters are imitating all-wool shirts, as to color, and we find many mills manufacturing solid tans, etc. The fine underwear knitters are placing orders extensively, and are anticipating a good run. One large maker of balbriggans, who had last season a good run, expects to make three or four times as many shirts the coming season. This is a two-threaded garment using 1/40s combed Egyptian. The knitters of lisle yarn, both from the Egyptian and Allen cotton, are placing orders extensively and expect good orders for the coming season. The sizes used are 2/42s, 2/44s, 2/50s and 2/55s. The trust is still in evidence and the prices are fairly well maintained among the large Eastern spinners. The commission houses selling this class of yarn are obliged to have other yarns to sell, from mills which are not in the combination. Yarn from such mills is offered from ½ to 1 cent under combination prices, and knitters will give this yarn a careful trial in order to make the cheaper yarn work if possible. The manufacturers of hosiery are beginning to feel the good effects of the tariff, and look for a good season's business after the first of the year, when the heavy-weight season starts in. The price of yarn is lower today than it will be again for some time to come.

Worsted Yarn: Spinners have been securing orders at prices which are low compared with the price of wool. We hear of one salesman who has figured on orders for several hundred thousand pounds of yarn, but who was unable to book an order on account of the low standard of values. There is no doubt of a growing demand for better cloth, all worsted, of about medium value. Cotton-Worsteds, with a percentage of wool, are not selling, and this class of cloth is suffering severely. One mill we hear of, with 110 looms, had secured orders for only 135 pieces up to August 20th, and another mill had secured but 400 pieces. Some of the mills manufacturing three percentage cotton and worsted will shut down unless more orders are forthcoming. The manufacturers of this class of cloth are a disappointed lot of men, as they anticipated a big business. They have the coloring of the cotton yarn used in this work, down to a science, as they guarantee the colors to stand as fast as wool. This cotton-worsted business has degenerated to an all-cotton worsted, and in a degree explains the depression in the worsted yarn trade. We hear of one large New York commission house which has sold, during the present light-weight season, over $3,250,000 worth of cotton-worsteds, which has not one pound of worsted in them. They were sold for 20 cents per yard, ¾ goods, and evidently were made on

(Continued on page 131.)

Frank E. Patterson, Prest. Oscar W. Wood, Treas

GERMANTOWN SPINNING COMPANY INCORPORATED GERMANTOWN JAN. 9TH 1890

Germantown Spinning Co.

COTTON CARDED

HOSIERY YARNS

In numbers from 6s to 26s.

Germantown, Philadelphia.

W. Warren Thread Works,

WESTFIELD, MASS.

HOSIERY AND SEAMING YARNS.

Also Polished Threads.

Our bleaching and dyeing facilities are new and unsurpassed for prompt and neat work. Correspondence solicited.

Chas. B. Cook, *Pres.* Arthur H. Mason, *Treas*
Capital Stock, $500,000.

SANFORD SPINNING CO.

Fall River, Mass.

32,000 Spindles. Weekly product, 65,000 pounds 6s to 30s.

Colored Cotton Yarn

From American Peelers and Egyptian Cottons.

Solids, Mixtures, Bleached, Combed and Carded Egyptians. Cops and Cones.

Knitting and Weaving Yarns

Cones, Cops, Warps, Skeins,
Single, Double, Three-ply, etc.
Peeler, Egyptian, Mixed Colors.
Large Assortment.

EDWARD S. HYDE, 223 and 225 Chestnut Street, **Philadelphia, Pa.**

(Continued from page 129.)

gingham looms. Serges continue to sell well and weavers manufacturing them and also other piece-dyed worsteds have placed orders for large amounts of yarn to be delivered during January, February and March. Prices secured have been low, and the buyers feel that the prices on worsted yarn has reached the bottom. If we cannot always chronicle the successes of mills, we must tell of their failures We hear that one large mill has made a heavy loss on buntings; 3000 yards were returned on account of color not holding, and also on account of the width not being satisfactory. This experience was predicted by us because of the inexperience of handling the cloth and not knowing the requirements of the trade. One concern on this work purchased largely of yarns to make the cloth, and are now trying to sell the yarn as they have abandoned the manufacture. The spinners of French Spun yarn are in a better position than those running the English system, as they have not to contend against a demoralized market. Knitters will all be on the market after the first of the year. The hosiery manufacturers will, next season, have undisturbed control of the American market of stockings, and will need much French Spun yarn. Many who did not buy last season, on account, having anticipated their requirements, will be forced to buy after January. The outlook for the spinners of French System yarn is very bright indeed.

We quote: All Australian, 2/40s, $1, 2/50s $1.05, Half Delaine, half Australian, 2/40s 95 cents., Half blood, 2/40s 82½ cents. Three-eighths to half blood serge yarn. 2/36s 70 to 72½ cents. Three-eighths blood, 2/20s 65 to 66 cents. Good quarter, 2/14s 59½ to 62 cents.

Woolen Yarn: Spinners are getting but few orders and the mills are slack. Some orders have been placed by hosiery mills and some job spinning has been secured, but not enough to fur-

(Continued on page 133.)

CATLIN & CO.,
YARNS.
67 Chauncy St., Boston
216 Church St., New York.
206 Chestnut St., Philadelphia.

ALEX'R KING & CO.
YARNS.
FINE IMPORTED YARNS A SPECIALTY.
54 Leonard St., New York.

JAMES E. MITCHELL & CO.,
Commission Merchants.
122 & 124 Chestnut St., Philadelpia, Pa.
6 & 8 Summer St., Boston.
Cotton, Woolen & Worsted Yarns.
All numbers on Hand and Made to Order.

O. S. HAWES & BRO.,
WEAVING and HOSIERY **YARNS,**
All Plies and Numbers.
Imported Yarns a Specialty.
82 and 84 BEDFORD ST., FALL RIVER, MASS.

TUCKER & COOK MFG. CO
MANUFACTURERS OF
WHITE AND COLORED COTTON **WARPS**
Nos. 6s to 30s,
On Beams, Jack Spools or in Chain
CONWAY, MASS.

GRANT YARN CO.,
COMBED AND CARDED COTTON
YARNS 40s and above. AND
FITCHBURG, MASS. **WARPS**

E. JENCKES MFG. CO.
Colored Cotton, Hosiery, Woolen and Merino **YARNS**
PAWTUCKET, R. I.

LINEN YARN IMPORTER.
Hughes Fawcett, 115 Franklin St., New York,
Flax, Hemp & Jute Line and Tow Yarns,
FOR WEAVING PURPOSES
Linen Jacquard Harness Twines.
Fine Cotton Harness and Heddle Twines.
For Cotton, Silk, Woolen and Carpet manufacturers. Correspondence solicited. Samples promptly furnished.

CAPACITY, 50,000 Spindles.

ORSWELL MILLS

FITCHBURG MASS.

COMBED OR CARDED

COTTON YARNS

In Chains and Skeins, on Balls, Beams, Spools—single or twisted.

The J. R. MONTGOMERY CO.,

WINDSOR LOCKS, CONN.

Mercerized Cotton Yarn in two or more ply. Gives a permanent lustre equal to spun silk.

Novelty Yarns, Mohair Loops, Cotton Flake and Nub Yarns.

High Grade Cotton Warps, in colors, on beams, in chain warps or in skeins, single or two-ply.

Printers of Cotton, Wool, Worsted or Silk Yarns.

Cotton Warps.

WHITTIER COTTON MILLS,
LOWELL, MASS.

Cohannet Mills,
TAUNTON, MASS.
Spinners of High Grade
HOSIERY YARNS OF EVERY DESCRIPTION.
Selling Agents JAMES E. MITCHELL & CO., Philadelphia and Boston.

Eddy & Street,
COTTON, WOOLEN, YARNS AND BRAIDS WORSTED, SPUN SILK.
PROVIDENCE, R. I.

INDIAN ORCHARD CO.,

Indian Orchard, Mass.

MANUFACTURERS OF

Lustred Cotton Yarns.
In Various Colors and Twists.

NOVELTY YARNS
In Cotton, Silk and Worsted, in various patterns and colors.

Cotton Warps and Yarns
In Gray and all colors, single or 2, 3, 4 and 6 ply, and Cable Cord.

COLORED COTTON
Machined, Carded or in Roving.

(Continued from page 131.)

nish work to any extent to the spinners. We hear of one spinner busy manufacturing yarn for the government. Shortly, spinners selling 2-ply yarn, will secure orders from knitters requiring these yarns. The demand will be brisk as many of these knitters have entirely run stocks down. The government is "turning down" much cloth which is being delivered from different mills and much of this cloth is being redyed and sold on the market for what it will bring. The cashmere mills are all badly off and have secured few, if any orders. We note that there is beginning to come forward for immediate consumption, thread waste, on which a duty of 20 cents per pound is paid. We hear of one large waste dealer who has over 30,000 bags of noils on hand which have been delivered him on contract. Merino wools in Europe continue in good demand in London, but owing to the smallness of the stocks available for sale by private parties, there has not been much business reported. The knitters in New York State and Connecticut are running fairly well and are placing orders for stock at this time, when tempting offers are made, and it looks as though many of the mills would be out of stock and on the market for more before Jan. 1st. The next season should bring forth a good business as many of the mills which ordinarily ordered woolen yarn the first part of the year, purchased largely in excess of their requirements under the low tariff and consequently did not need yarn at that time. Also it is a fact that many mills which purchased yarn last year for the heavy-weight season did not take one pound of the yarn ordered, and many spinners who thought they had orders to run them the whole season have not run more than three months' time. It is a curious way buyers have of placing orders at this time. Orders are secured more freely in the West, and the buyers place their contracts in December and January in New York, while in the East

(Continued on page 135.)

Colchester Mills,
SPINNERS OF
Made from Colchester Mills Sanitary Random Yarn
Mule Spun Cotton Hosiery Yarns.
Sales in Charge of A. D. SALKELD, 86 & 88 Franklin St., NEW YORK.
Representing B. B. Smalley, Thos. F. Patterson, F. E. Snow Receivers Colchester Mills.

WOOLEN AND MERINO YARNS.
Special line for Bicycle and Golf Goods in all shades
For Hosiery, Gloves, Underwear, and all kinds Knit Goods. Cop, Cone and Skeins.
The J. & H. Clasgens Co.
New Richmond, O.

WOOLEN YARNS.
All grades Woolen, Mixed and Merino yarns.
15 SETS CARDS.
EDWARD M. ROCKWELL,
LEOMINSTER. - MASS.

A. HERBST. J. W. JONES.
HERBST & JONES,
Successors to Kershaw Worsted Co.
WORSTED YARN SPINNERS,
21st & Naudain Streets,
PHILADELPHIA.

ALBERT R. ELSASSER,
Clifton Worsted Mills.
Lustre Worsted Roving and Yarns
A SPECIALTY.
MILLS: ADDINGHAM, DEL. CO. PA.

C. MOORE & CO.,
MANUFACTURERS OF
TWINES, THREADS AND YARNS.
Jacquard Harness Twines of all kinds on hand and made to order.
S.W. COR. FIFTH & MARKET STS.,
Philadelphia.

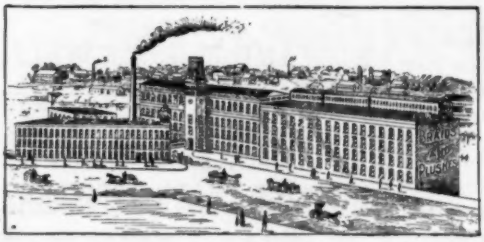
EICHMANN & STERNBERG
530 Broadway cor. Spring St., NEW YORK.
Plain and Gassed Cotton Yarns,
HOSIERY COTTON YARNS,
Mercerized Cotton Yarns (Simile).

COTTON WARPS
White or Colored.
Toweling and Grain Bags.
Dana Warp Mill,
WESTBROOK, MAINE.

HADLEY
SPOOL COTTON AND FINE YARNS
COMPANY
COTTON SPINNERS.
MILLS AT HOLYOKE, MASS.

SPINNERS OF
FINE COTTON YARNS
30s TO 100s.
Gray, Bleached, or Colored. On cop, in skein on spools, cones or tubes.
Fine Cotton Warps, single and two-ply, in chain, etc.
Spool Cotton and Seaming Thread.
95 Milk St., BOSTON.

THE WILLIAM CLARK COMPANY,
WESTERLY, R. I.
Mills equipped with the latest and most improved machinery.
Combed Egyptian from No. 20s to 100s. Combed Sea Island from No. 40s to 200s.
Also 2, 3, 4, 5 ply and 6, 9 and 12 ply cable laid.
Hosiery Yarns on Cops Tubes or in Skeins, Grey, Bleached or Dyed. (Fast Colors.



FLYER SPUN
Mohair and Worsted
YARNS.
Mohair Plushes,
Worsted and Cotton Braids.
D. COFF & SONS, Pawtucket, R. I.
— ESTABLISHED 1861. —

MONUMENT MILLS,
Manufacturers of
White, Colored, Fancy and Double and Twist,
COTTON WARPS
HOUSATONIC, MASS.
4s to 60s.

YARNS
SOLIS : : BOSTON.
179 Devonshire Street.
ANDREW J. SOLIS, Jr. & CO.

GREENE & DANIELS MFG. CO.,
COMBED, CARDED AND GASSED
Yarns, Threads, Twines and Chain Warps,
Colored and Bleached Yarns Furnished in any manner desired by the trade.
PAWTUCKET, R.I.

A copy of the Textile World's Directory is presented to every paip-up subscriber of the Textile World, with the compliments of the publishers.

Continued from page 133.

generally orders are not placed before June, July and August. These New York buyers purchase from hand to mouth as goods are wanted. In underwear, cash houses buy goods and take a six per cent. discount and sell these goods in case lots to the larger stores for the same price as they buy without the discount for cash, and the six per cent. discount is all that is made in the transaction.

Philadelphia Yarn Market.

The yarn market has continued slow the past month, yet customers have taken old orders with fair promptness and regularity.

Some prices have been reduced and occasionally a shortage in some number has induced an advance in price; notably in 20/1 warps, which were advanced the past two weeks, ½ to ¾ cents a pound.

The most staple yarns which are ordinarily piled up by spinners when not filled up with orders, of course depreciate in dull times, until they get below cost.

The upholstery and woolen trade are still dull. Some numbers are down to about cost and there is very little chance of their getting lower, and with the recent firmness in cotton, an advance in price is confidently looked for. We quote:

WARPS.

20/1	12½ to 12¾
22/1	13
26s	13½
12/2	12½
14/2	12½
16/2	13
20/2	13 to 13½
30/2	15½ to 16
40/2	22 to 23

SKEIN.

26/1	12 to 13
20/1	12 to 12½
19/1	12 to 12½
4s to 10s soft	10½ to 11
12/1	11½ to 12
12/2	11 to 11½
14/2	11½ to 12
20/2	13 to 13½
30/2	15½ to 16
40/2	21 to 22½

Walcott & Campbell Spinning Co,
IROQUOIS MILLS.
FANCY HOSIERY YARNS
IN ALL COLORS.
New York Mills, Oneida Co., N. Y.

BURNET & CO.,
24 George Sq., Glasgow, Scotland.
All numbers and qualities of Cotton Yarns, specialties in
"Silkoline," "Ramie" and Fancies; also bleached filling on long tubes. Turkey reds, etc. A B C Code used. Telegraphic address "Tenrub, Glasgow."

B. F. BOYER & CO.,
Successors to GEORGE SHIMER & BOYER,
HOSIERY YARNS,
In Wool, Merino and Worsted.
GOLF YARNS,
In Wool and Worsted. Also carry a full line
BUNDLE YARNS
For the Jobbing Trade.
MILLS AND OFFICE AT
CAMDEN, - - N J.

8/3	10 to 10½
10s double reeled	10½
16/3	12
16/4	12
16/2	12

SOUTHERN CONES.

6s to 8s, various qual.	11¾ to 12½
10s " "	12 to 12½
12s " "	12½ to 13
14s " "	13 to 14
16s " "	14 to 14½
20s " "	15 to 15½
22s " "	15 to 16
24s " "	15½ to 16½
26s " "	16 to 16½
30s " "	18 to 19

SHUTTLE COPS.

6s to 8s	11½ to 12
12s	11½ to 12
16s	12½ to 13
26s	13½
40s	18 to 19

MIXED COLORED CONES.

6s to 8s	13½
10s	13½ to 14
12s	14 to 14½
14s	15
16s	15½

(Continued on page 137.)

HOWLAND CROFT, SONS & CO.

LINDEN WORSTED MILLS.

Fine Worsted Yarns

OFFICE AND MILLS:
Broadway and Jefferson Avenue,
CAMDEN, NEW JERSEY.

ALLEGHENY WORSTED MILLS,

Thomas Wolstenholme, Sons & Co., MANFRS. OF

ALL NUMBERS SINGLE AND TWO-PLY,

Worsted YARNS,

Sell Direct,

on Cop or in Skein, for Weaving and Knitting Purposes, in White, Natural & Fancy Mixes.
Office and Mills: Frankford Ave. and Westmoreland St., Phila., Pa.

CRANSTON WORSTED MILLS.

Worsted and Mohair Yarns—white or colors, in skeins, on spools, cones, or shuttle bobbins.

NOVELTY YARNS—of Mohair and Worsted. We are the only manufacturers in the United States making these yarns from the raw material to finished product and making Yarns **only.**

CENAPPED YARNS of all kinds. Doup Yarns. Harness Yarns for Braids, etc.

BRISTOL, R. I.

George Campbell & Co.

Worsted Spinners.

Yarns, both French System and Bradford.

Knitting Yarns in all Grades and Mixes.
All Numbers to 60s.

21ST STREET AND WASHINGTON AVENUE, PHILADELPHIA.

MALCOLM MILLS CO.,

MANUFACTURERS OF

Novelty Yarns, Silk Noil Yarns, in Fast Colors AND White.

Mills, Frankford, Pa. Office, 229 CHESTNUT ST., PHILA.

(Continued from page 135.)

EASTERN COPS.

12s	shuttle	. . .	12½ to 13½
14s	"	. . .	13 to 14
16s	"	. . .	14 to 14½
10s	hosiery	. . .	13 to 13½
14s	"	. . .	13½ to 14
16s	"	. . .	14 to 14½
20s	"	. . .	15 to 15½
24s	"	. . .	16 to 16½

Eastern skein ½ cent above cops.

Eastern cones ½ to 1¾ cents above cops.

Egyptian carded 4 to 5 cents above white.

Combed yarn 4 to 5 cents above carded.

—A French exchange gives a very flowery description of the Vallet-Rogers new machine. This new appliance for scrutching and hackling flax is mounted on a frame resembling that of the ordinary hackling machines. All the details work harmoniously and automatically without the intervention of the attendants, their action being consequently regular and ensuring perfection in working. A special arrangement enables the machine to be instantly adjusted for treating any kind of flax—coarse or fine—strong or weak. To the scutcher is attached a hackler which completes the process, and the first series of combs which are composed of toothed plates designed to exert a scraping action on the flax fibres both in front and latterly. These combs are succeeded by a series resembling those ordinarily used in hackling. Dust is removed from the flax and machine by an aspirator above the latter.

—Mercerized cotton acquires during its production an increase of 4.5 to 5.5 per cent. in weight, this being due to the production of a hydrate. The formation of the hydrate $C_{12}H_{20}O_{10}$ H_2O requires by theory an increase of 5.55 per cent.

—When cotton is mercerized under tension the fibre appears more translucent and much more lustrous, as well as smaller in diameter than when mercerized by immersion only.

—Mercerized cotton exhibits a much greater affinity for many mordants and dyes than does the untreated fibre This increased affinity is no doubt partially due to the greater absorptive power of mercerized cotton, but that this is not the only cause is shown by the fact that the prepared cotton has a definite affinity for certain bodies—e.g., beta-naphthol—for which ordinary cotton has no attraction whatever.

SILK NOILS AND SILK NOIL YARNS
IN WHITE AND COLORS.
MOHAIR LOOPS, KNOTS, AND FANCY YARNS FOR DRESS GOODS AND CLOAKINGS.
A. T. SKERRY & CO., 47 LEONARD ST., NEW YORK.

THE PHOENIX MILLS CO.,
MANUFACTURERS OF
Fine Worsted Yarns.
Correspondence Solicited. Samples furnished on application.
BOSTON OFFICE: 620 Atlantic Ave. Rooms 10 and 11.
MILLS: 10th & Germantown Ave., Phila. Chester, Pa.
PHILA. OFFICE. No. 13 LETITIA ST.

GEORGE SHIMER & SON,
Spinners of Worsted Yarn for the Weaving and Knitting Trade.
All kinds of Fancy Yarns for the Knitting Trade.
5th and Erie Sts., Camden, N. J.

CHENEY BROTHERS,

SILK MANUFACTURERS.

ALL KINDS OF

Knitting Silks, Ribbons AND Piece Silks,

USED FOR TRIMMING KNIT GOODS.

TRAMS, ORGANZINES and SPUN SILKS, in the Hank, or on Spools or Cones, for Manufacturers' Use. Silk for Special Purposes Made to Order.

MILLS: South Manchester and Hartford, Conn.

SALESROOMS: 477, 479 and 481 Broome Street, NEW YORK.
79 Chauncy Street, BOSTON.
186 Franklin Street, CHICAGO.

WILLIAM RYLE & CO.,

DEALERS IN

Domestic Thrown Silk of every description. Fine Pure Dye Silks for the woolen trade a specialty. Foreign and domestic

SPUN SILK YARNS AND NOILS

Importers of European and Asiatic Raw Silk.

54 Howard St., cor. Mercer St., - NEW YORK.

G. J. LITTLEWOOD & SONS, Ltd.

ALBION

DYE and BLEACH WORKS,

MANAYUNK, PA.

DYERS of Cotton, Cotton Yarns, Wool and Raw Stock Generally. **BLEACHERS** of Cotton and Cotton Yarn.

CITY OFFICE: 132 Chestnut Street. Telephone Connection,

PHILADELPHIA. **MAIN OFFICE AT THE WORKS.**

[PATENT APPLIED FOR]

IRONPHALT ROOFING

Guaranteed for 6 years when applied as per our specifications.

Is the most permanent covering for all kind of buildings. Ready for application. Write for samples and compare with other roofings.

Catalogue Free.

SPECIALTIES: 2 and 3 Ply Roofing, Insulating, Building and Sheathing Papers, Asphaltum, Pitch, Roof Paints, etc.

ARMITAGE MFG. CO., **Richmond, Va.**

PROVIDENCE DYE WORKS.

Dyers and Finishers,

COTTON YARNS, Suited for HOSIERY and WEAVING Cotton, Woolen and Worsted DRESS GOODS, Woolen and Worsted Mixed CASSIMERES and CLOAKINGS, also Woolen and Worsted Slubbing, COTTON YARN and WARP DYERS and BLEACHERS.

FIRTH & FOSTER CO.,

OFFICES: **Philadelphia, 546 Bourse Building.**
New York Office, Silk Exchange, Broadway and Broome St.
WORKS: **Taylor, Emerald and Adams St., Kensington, Philadelphia, Pa.**

Boston Finishing Works

WILLIAMSTOWN, MASS.

BLEACHERS, DYERS AND FINISHERS

Of Pure Finish Shirtings, Sheetings, Canton Flannels and Filled Good
Also Silesias, Satteens, Corset Jeans, Cambrics, Sleeve Linings, Pocketings, Flanneletts, and all descriptions of Dyed Goods.

NAPPING A SPECIALTY.

Being equipped with the French and other Foreign and Domestic Napping Machines we are prepared to give any kind of Nap required, including the French FlannelFinish.

R. GREENWOOD & BAULT,

GLOBE DYE AND BLEACH WORKS,

FRANKFORD, - PHILADELPHIA.

Specialists in Cotton Warps and Skein Dyeing.

HOME BLEACH AND DYE WORKS,

PETER B. McMANUS, Proprietor.

Dyers and Bleachers of Cotton Yarns,

PAWTUCKET, R. I.

Pawtucket Dyeing & Bleaching Co., BLEACHERS AND DYERS OF

COTTON YARNS AND STOCKINET.

OFFICE WITH BLODGETT & ORSWELL CO., Manufacturers of Glazed Yarns,
28 BAYLEY ST., PAWTUCKET, R. I.

COCHRANE CHEMICAL CO.,

50 Kilby St., Boston, Mass.,
MANUFACTURERS OF

ACIDS, AMMONIAS, ALUMS, SODAS
And other Chemicals.

FAST COLORS

For Wool, Woolen and Cotton Yarn and Piece Goods Dyeing, and for Calico Printing

ALIZARINE RED, PASTE AND POWDER.

Alizarine Blues, Oranges, Browns, Yellows, Maroon, Gray and Black.
Cœruleine, Galleine, Mythylene Grays.
Thionine Blues, Thionine Indigo, Solid Green and
PATENT BLUES (superseding Extracts of Indigo on account of fastness and color bloom) for Wool and Silk, Benzidine and Primuline Colors, Zinc Dust, Aniline Salts and Oil.

VICTOR KOECHL & CO. 122 HUDSON ST., NEW YORK.

SOLE AGENTS FOR

FARBWERKE, formerly MEISTER, LUCIUS & BRUENING, HOECHST o | M.; A. LEONHARDT & CO., Muehlheim o | M.

BRANCH OFFICES:

Boston, Mass., 138 Milk St.; Philadelphia, Pa., 39 N. Front St.; Providence, 45 S. Main St.

New York and Boston Dyewood Company,

MANUFACTURERS OF

DYEWOOD EXTRACTS.

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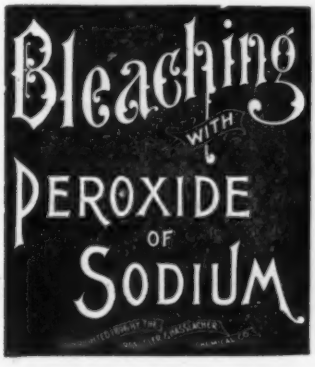

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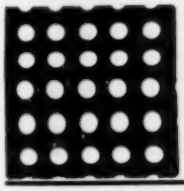

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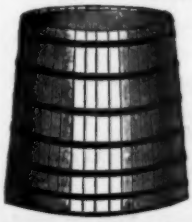

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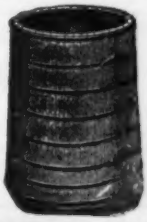

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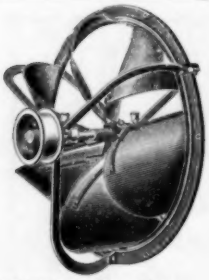

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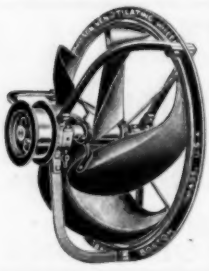

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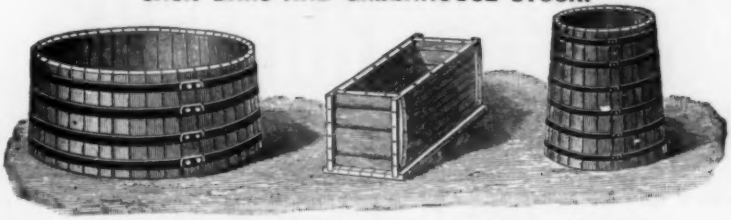

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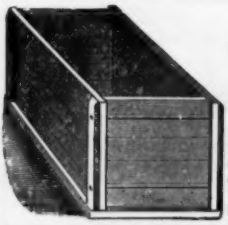

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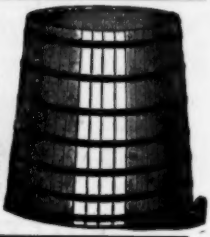

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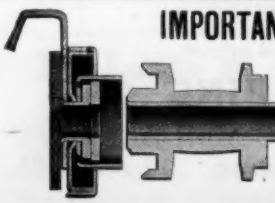

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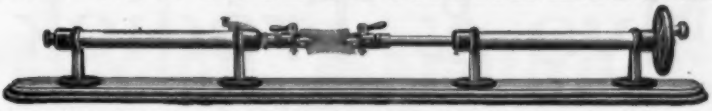

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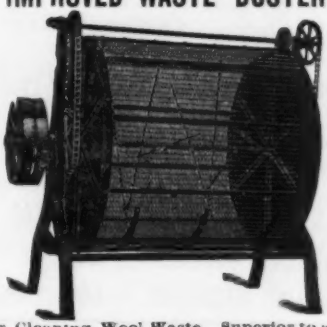

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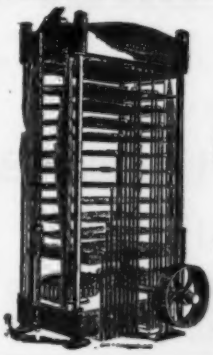

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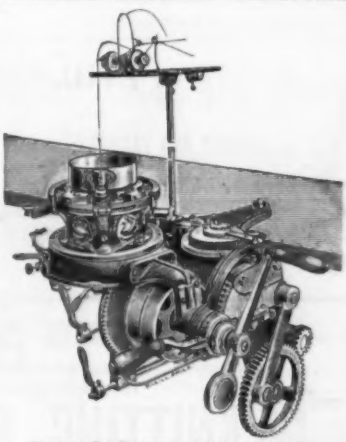

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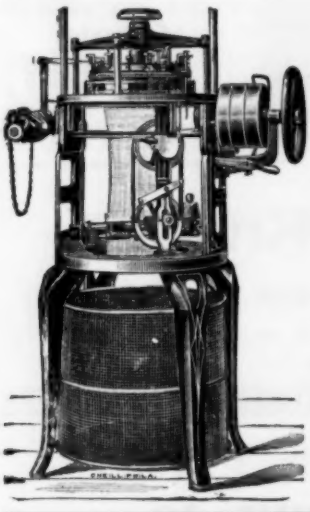

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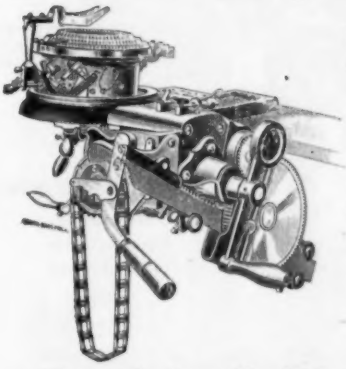

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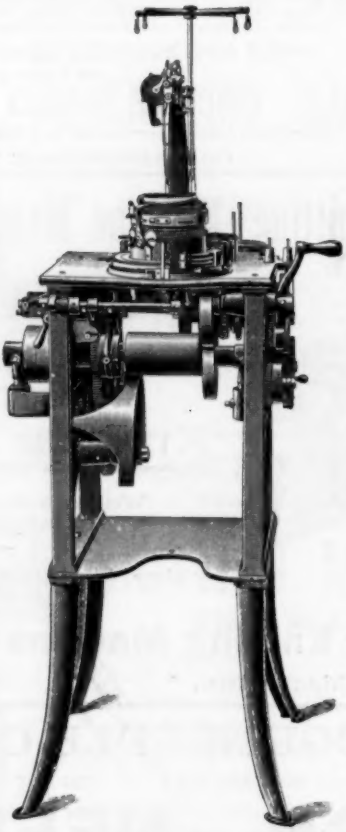

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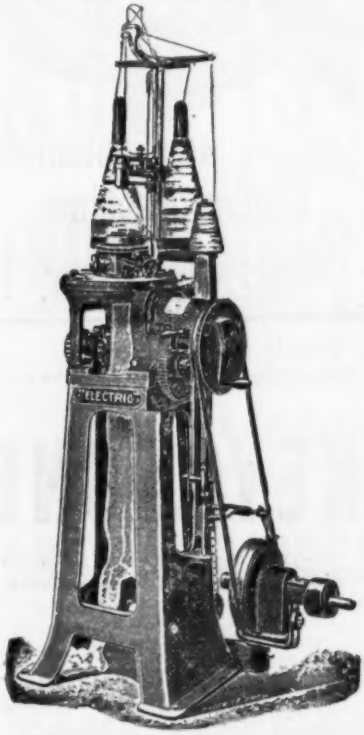

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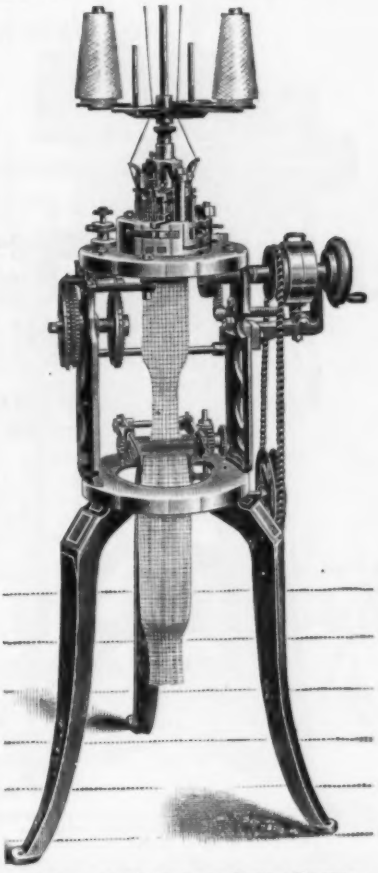

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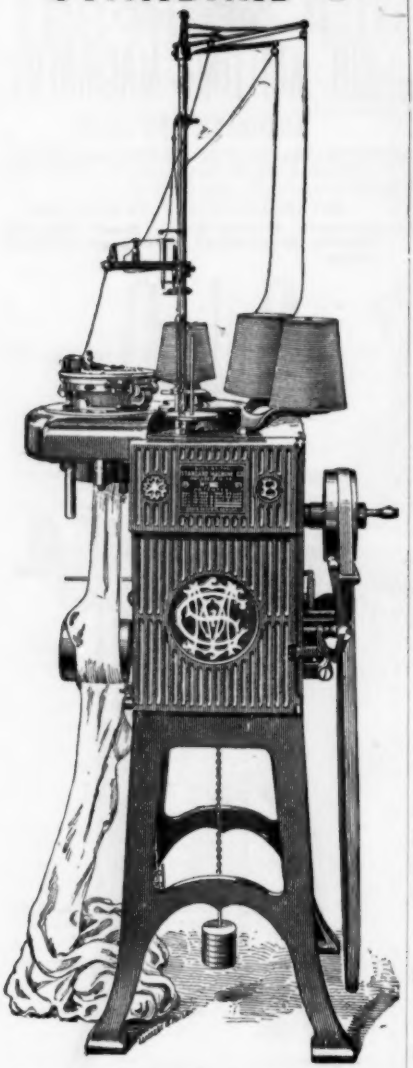

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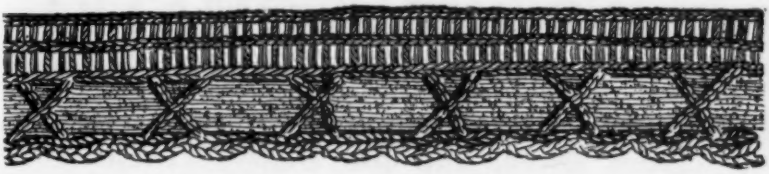

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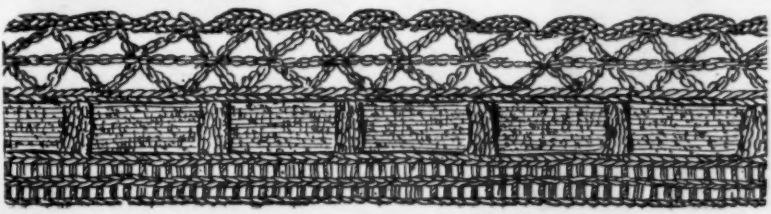

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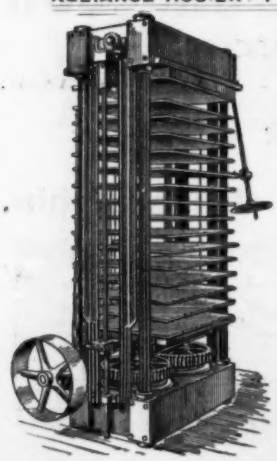

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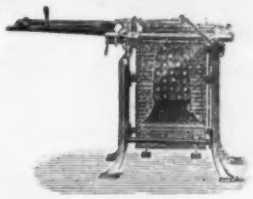

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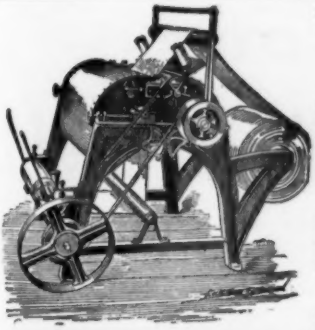

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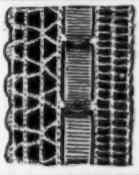

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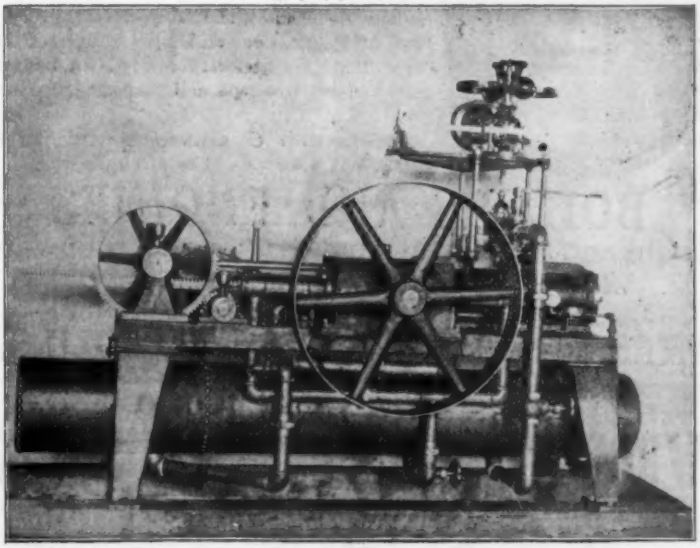

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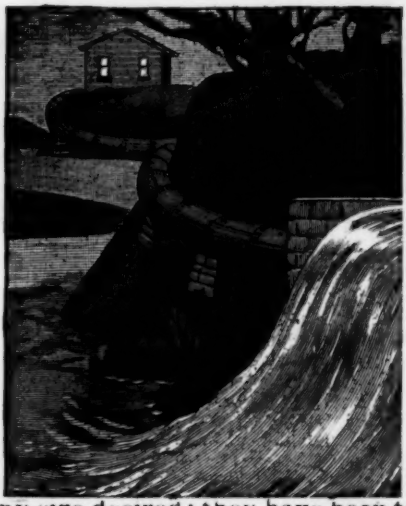

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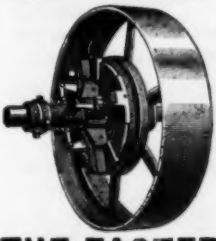

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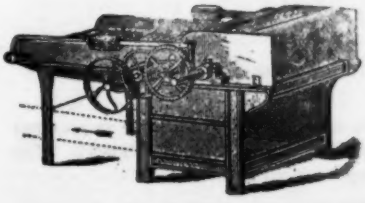

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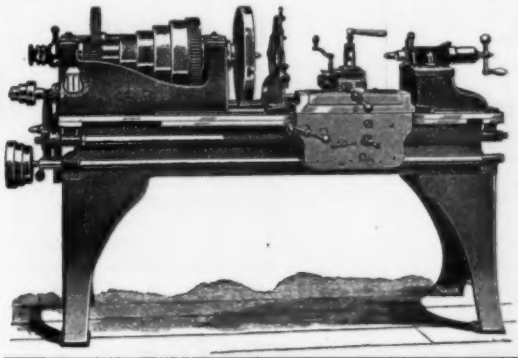

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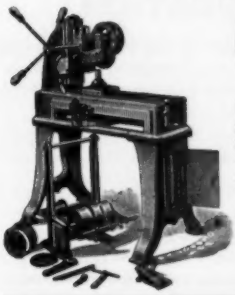

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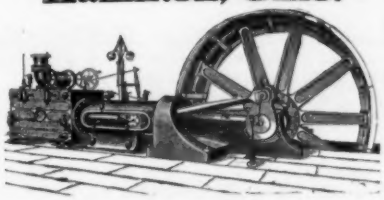

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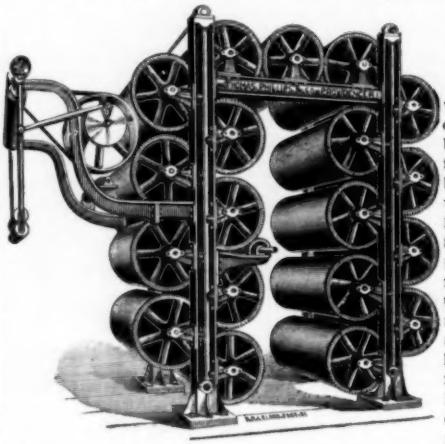

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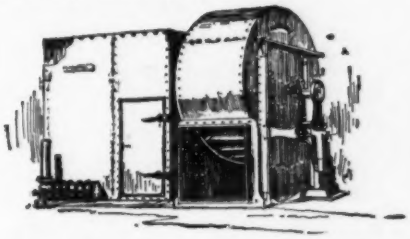

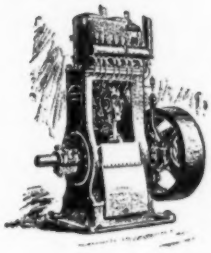

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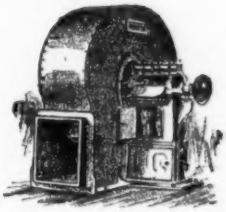

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